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November1998

EPA Superfund Record of Decision:

DuPage County Landfill/ Blackwell Forest Preserve Warrenville, IL 9/30/1998

SEP 30 1998

RECORD OF DECISION

DECISION SUMMARY

DUPAGE COUNTY LANDFILL/BLACKWELL FOREST PRESERVE

DUPAGE COUNTY, ILLINOIS

Prepared by:

U.S. ENVIRONMENTAL PROTECTION AGENCY

Region V

Chicago, Illinois

September 1998

Declaration
Selected Remedial Alternative
for the
DuPage County Landfill/Blackwell Forest Preserve
DuPage County, Illinois

Site Name and Location

DuPage County Landfill/Blackwell Forest Preserve
DuPage County, Illinois

Statement of Basis and Purpose

This decision document presents the rationale for selecting the final site-wide remedy for the DuPage County Landfill/Blackwell Forest Preserve Site ("DuPage County Landfill" or "the Site") located in DuPage County, Illinois. This Record of Decision was completed in accordance with the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 ("CERCLA"), as amended by the Superfund Amendments and Reauthorization Act of 1986 ("SARA") and, to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan ("NCP"). This decision document explains the factual and legal basis for selecting the final remedy for the Site. The information supporting this remedial action decision is contained in the Administrative Record for the Site. The State of Illinois has expressed a willingness to concur with the selected remedy. This letter of concurrence will be added to the Administrative Record for this Site.

Assessment of the Site

Actual or threatened releases of hazardous substances from this Site, if not addressed by implementing the response action selected in this Record of Decision ("ROD"), may present an imminent and substantial endangerment to public health, welfare, or the environment.

Description of the Selected Remedy

The remedial action contained in this ROD will be a final Site-wide remedy. The selected remedial action addresses the major threat posed by this Site by off-site treatment and disposal of leachate and addresses the low level sources of contamination by containment of the landfill and contaminated soils, management of landfill gas and Monitored Natural Attenuation for ground water. The final remedy builds upon previously implemented response actions which include: cap improvements, installation and operation of a leachate collection system, off-site leachate treatment, and installation of a landfill gas management system. The final remedy selected for the Site incorporates both long-term operation and maintenance of these components and other response actions. Specifically, the United States Environmental Protection Agency ("U.S. EPA") has determined that the following measures should be implemented as the long-term remedy in order to fully address all threats to human health and the environment posed by contamination at the Site:

- Institutional controls in the form of future land-use and ground water use restrictions;
- Long-term cap inspection and maintenance including storm water and erosion control;
- Long-term operation and maintenance of the landfill leachate collection system with possible augmentation;
- Continued off-site treatment and disposal of landfill leachate;
- Long-term operation and maintenance of the passive landfill gas venting system with possible augmentation to active gas collection and on-site thermal treatment;
- Monitored Natural Attenuation for ground water, and
- Long-term ground water, landfill gas, and leachate monitoring.

The selected remedial action, incorporating previous response actions, will address all threats posed by the Site.

Declaration of Statutory Determinations

The selected remedy is protective of human health and the environment, complies with federal and state requirements that are legally applicable or relevant and appropriate to the remedial action, and is cost effective. The remedy utilizes permanent solutions and alternative treatment (or resource recovery) technologies to the maximum extent practicable, and satisfies the statutory preference for remedies that employ treatment that reduces toxicity, mobility, or volume as a principal element.

Because this remedy will result in hazardous substances remaining on-site above health-based levels, a review will be conducted every five years after commencement of remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment.

U.S. EPA has determined that its future response at this Site does not require any further physical construction. Therefore, the Site now qualifies for inclusion on the Construction Completion List.

Data Certification

The following information was used in determining the selected remedy and is included in the ROD:

- A description of the Contaminants of Potential Concern and their respective concentrations;

- Baseline risk represented by the Contaminants of Potential Concern;

- Cleanup levels established for Contaminants of Potential Concern and the basis for the levels;

- Current and future land use assumptions from the Baseline Risk Assessment;

- Land use that will be available at the Site as a result of the selected remedy;

- Estimated capital, operation and maintenance (O&M), and total present worth costs; discount rate; and the number of years over which the remedy cost estimate is projected; and

- Decisive factors(s) that led to selecting the remedy.

Wm. E. Muno

William Muno
Superfund Division Director

9/30/98
Date

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DuPage County, Illinois

DECISION SUMMARY FOR THE FINAL REMEDIAL ACTION

DUPAGE COUNTY LANDFILL/BLACKWELL FOREST PRESERVE SITE
DuPage County, Illinois
CERCLIS ID # - ILD980606305

I. SITE NAME, LOCATION AND DESCRIPTION

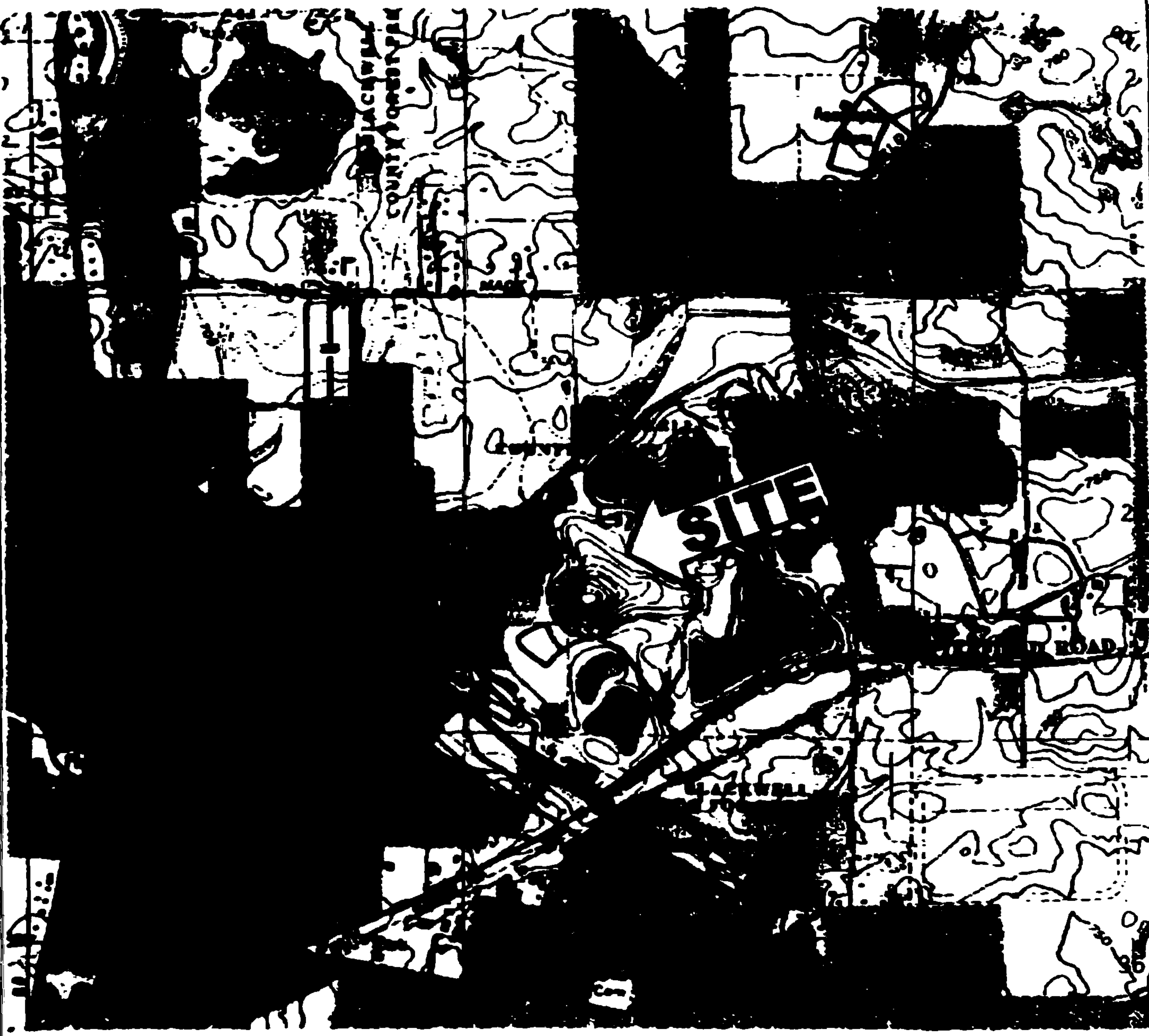
The DuPage County Landfill/Blackwell Forest Preserve Site ("the Site") is located approximately 6 miles southwest of downtown Wheaton, near Warrenville, in DuPage County, Illinois (see Figure 1). The Site is located in Section 26, Township 39 North, Range 9 East, DuPage County, Illinois. The Site is part of the Roy C. Blackwell Forest Preserve and is owned by the Forest Preserve District of DuPage County.

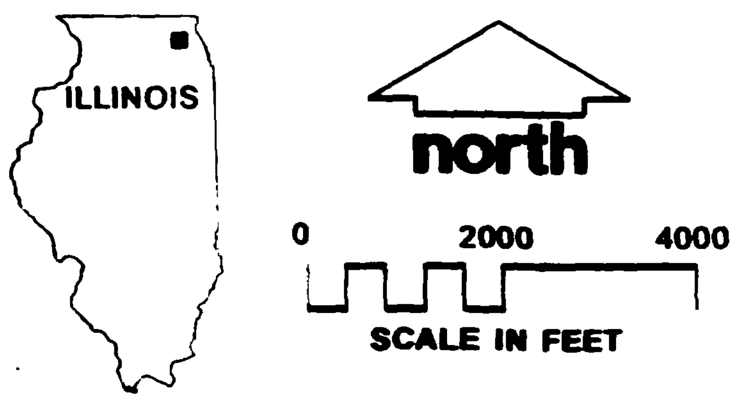
The Site is an approximately 40-acre landfill centrally located within the approximately 1200-acre Blackwell Forest Preserve. The Forest Preserve is owned and managed by the DuPage County Forest Preserve District ("FPD") and is open space containing woodlands, grasslands, wetlands and lakes used by the public for recreational uses such as hiking, camping, boating, fishing and horseback riding. The boundaries that define the Site (within the greater Forest Preserve) are: on the north and east, the landfill is west of the "C" shaped Silver Lake from Spring Brook on the north to Butterfield Road on the south. The southern boundary extends along Butterfield Road to the intersection of Butterfield Road and the West Branch of the DuPage River, and then north to the intersection of the West Branch of the DuPage River and Spring Brook. The western boundary of the Site is formed by Spring Brook.

The surface topography generally slopes from northwest to southeast across the county. The maximum elevation of the Site is the 150-foot tall landfill itself (also known as Mt. Hoy). The top of the landfill is approximately 840 feet mean sea level (M.S.L.). The landfill slopes sharply south toward Sand Pond which has an elevation of 690 M.S.L. and more gently northeast toward Silver Lake at 708 M.S.L. Figure 2 is a Site Features Map.

The landfill is located within the Spring Brook watershed of the West Branch of the DuPage River drainage basin. From Spring Brook, surface water drains to the West Branch of the DuPage River and, ultimately, to the Des Plaines River.

The hydrogeologic setting varies in an east to west direction (upgradient to downgradient). East or upgradient of the landfill the following units are present, in ascending order: the bedrock aquifer, the Malden/Tiskilwa Till aquitard, and the Yorkville Till aquitard. West or downgradient of the landfill, the bedrock aquifer and the Malden/Tiskilwa Till aquitard are present along with the shallower outwash aquifer. The location of the landfill is such that it lies across the contact between the outwash aquifer and the Yorkville Till aquitard. Therefore, the outwash aquifer is not present upgradient or east of the landfill. The dolomite bedrock aquifer and the outwash aquifer are the only aquifers present and are interconnected downgradient of the Site. Ground water flows in the bedrock (or deep aquifer) are consistently in a southwesterly direction. Surface water exerts considerable control on the shallow outwash aquifer ground

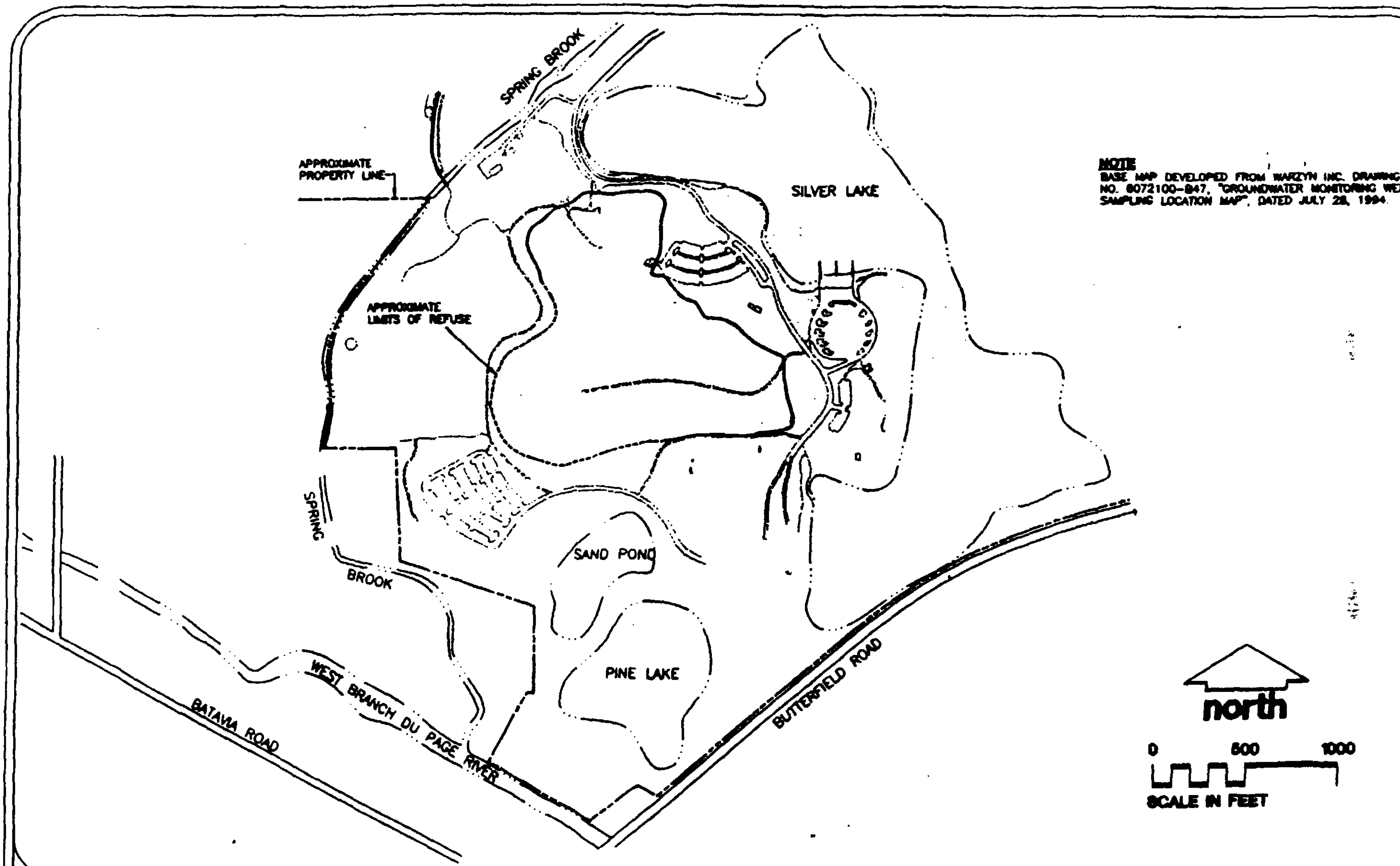




Base map developed from the
Naperville, Illinois 7.5 Minute
U.S.G.S. Topographic Quadrangle Map
Dated 1993

MONTGOMERY WATSON
Chicago, Illinois

FIGURE 1
SITE LOCATION MAP
BLACKWELL LANDFILL NPL SITE,
DUPAGE COUNTY, ILLINOIS



MONTGOMERY WATSON
Chicago, Illinois

FIGURE 2
SITE FEATURES MAP
BLACKWELL LANDFILL NPL SITE

water flow. The flow path for the outwash aquifer is initially southwesterly from the landfill. As ground water approaches Spring Brook the flows bend more southerly. At the south end of the landfill, near Spring Brook, ground water flow is actually southeasterly toward Sand Pond and Pine Lake.

There are a number of private wells east of the Site. Trace concentrations (several orders of magnitude below regulatory levels) of Volatile Organic Compounds (VOCs) were detected in private wells east of Spring Brook. Ground water elevations near Spring Brook indicate the presence of a hydrologic boundary for the shallow aquifer that restricts ground water flow to the west. For this reason, shallow ground water is not thought to be the source of contamination east of Spring Brook. It should also be noted that with one exception, VOCs were not found in monitoring wells more than 100 yards from the landfill. If VOCs in private wells near the Site actually came from the Site, then (1) monitoring wells over 100 yards from the landfill should have more consistently had VOCs, and (2) the concentrations of VOCs in monitoring wells over 100 yards from the landfill should have been higher than the concentrations of VOCs found in the more distant off-Site private wells.

The private well construction logs indicate that many of the private wells are screened in the deeper aquifer which is directly downgradient of the Site. VOCs and heavy metal contamination (significantly above background) are presently limited to the outwash aquifer just adjacent to the landfill footprint (several hundred feet east of Spring Brook). The VOCs found in private wells are inconsistent with the shallow ground water contaminant mixture. One possible explanation for the trace VOCs in the deeper aquifer may be the prior use of cleaners that were washed down drains and leached out of septic systems.

II. SITE HISTORY AND ENFORCEMENT ACTIVITIES

A. Site History

The 40-acre tract of land that is now the landfill was originally purchased by the FPD in 1960. The surrounding 1,100 acres were purchased during the next five years, with the intent of developing recreational uses after construction of the landfill. Initially, the FPD planned to use a nearby inactive gravel pit for solid waste disposal. However, in 1963 gravel excavations were ongoing at the pit and continued through July 1969. Concurrent with the gravel mining operation, the nearby lakes were enlarged and deepened. The gravel from the pit was sold to offset the cost of lake construction, recreational projects, and flood control projects. With the mining operation generating revenues, and the large amount of clay removed during the lake improvements that could be used for construction of a landfill elsewhere, the FPD abandoned the idea of placing waste in the gravel pit and began development of the landfill in its present location.

The landfill was originally designed with a three-to-one clay to refuse ratio, with the fill area to be constructed as a honeycomb of one-acre cells. Each cell would have a 1.5 foot thick clay base and a perimeter clay berm eight to nine feet in height. Each cell would be filled with two, three-foot lifts of refuse, separated by 6 inches of clay, and the cell would then be covered by 1.5 feet of clay. The cells were to be offset to maximize stability of the landfill. The landfill was then to be capped with 12 feet of compacted clay, covered by soil and vegetation.

Although daily records were not kept to detail how the construction proceeded, generally cells were developed across several acres by building side berms, and then filling the cells with refuse and daily cover. At the completion of each cell, the clay cover was installed and side berms were constructed for the next layer of refuse. As the landfill construction proceeded upward, the clay covers served as the liners for overlying cells. Approximately 1.5 million cubic yards of waste were deposited in the landfill between 1965 and 1973, creating Mt. Hoy which is approximately 150 feet above the original ground surface.

The following is a chronology of activities at the Site:

1965	Construction of the landfill.
1969	The first leachate[1] well was installed to monitor the amount and types of liquids contained in the landfill.
1970's	Ten (10) monitoring/piezometer wells were installed surrounding the landfill and measurement of ground water levels and samples for pH and chloride were taken.
1973	The last load of public refuse was accepted at the landfill.
1976	The picnic and camping areas, hiking trails, swim lake and Mt. Hoy opened at the preserve.
1980-82	In 1980, leachate was observed seeping from the north slope of the landfill. For this reason, 23 wells were installed to monitor ground water and two geologic studies were completed.
1982	Due to concerns about the accumulation of landfill gases, ten (10) shallow gas vents and six (6) deep gas vents were installed in the landfill.
1983	Ground water/surface water sampling program was implemented (continued until 1989).

[1] Leachate is a liquid (usually rainwater) that has percolated through contaminated soil and landfill waste and accumulates and transports contaminants.

1984-86	Twenty (20) additional monitoring wells were installed and added to the routine sampling program, two (2) shallow and eight (8) deep gas vents were installed and fourteen (14) borings were completed in the landfill.
1986	The Site was evaluated by the U.S. EPA for inclusion on the National Priorities List (NPL). The NPL is a list of sites throughout the country that are eligible for study and cleanup, if necessary, under the Superfund program.
1989	The FPD agreed to conduct a Remedial Investigation (RI) and a Feasibility Study (FS) at the Site. The purpose of the RI was to determine the extent of contamination associated with the Site and evaluate risks to human health and the environment. The FS evaluates alternatives for cleaning up the Site.
1990	The Site was formally listed on the NPL.
1994	The Remedial Investigation to determine the nature and extent of contamination is approved by U.S. EPA.
1995	The Feasibility Study analyzing cleanup alternatives is submitted to U.S. EPA by the FPD.
1996	The FPD entered into an Administrative Order on Consent (AOC) to complete several components of the required design and cleanup of the Site under removal authority.
1996	The FPD installs nine leachate extraction/landfill gas collection wells.
1997	A cap integrity investigation is completed and cap repairs are initiated.
	The leachate system extraction/containment is completed and off-Site treatment begins.
	The landfill gas collection system construction is completed and implemented.
	Five additional compliance/detection monitoring wells were installed.
1998	The final cap improvements are completed.

B. Response Actions

The Forest Preserve District, as both owner and operator of the Site, assumed full responsibility for investigation and cleanup. As indicated in the above chronology, EPA and FPD entered into an Administrative Order on Consent (AOC) in 1996. The purpose of the AOC was to expedite several response actions at the Site. The AOC Statement of Work identified a number of activities the FPD would conduct immediately, including:

- Soil borings to determine if any areas of the landfill did not have a minimum of two feet of low permeability cover material;
- Make any necessary repairs to the cap to ensure two feet of low permeability material is present above the waste;
- Enhance the surface drainage from the landfill to guard against the pooling of surface water and to prevent erosion;
- Install nine leachate extraction wells to remove liquids from within the landfill to protect underlying ground water;
- Install a subsurface pipe-work system to transport extracted leachate to a central collection tank for storage; this leachate is then transported to a permitted off-Site, facility for treatment and disposal;
- Install a passive landfill gas collection system to augment the 25 existing gas vents;
- Provide evidence that trees on the landfill were not in areas where root penetration could allow percolation of precipitation through refuse within the landfill;
- Evaluate the existing monitoring wells and implement monitoring to ensure that contaminant levels were not increasing or moving in a way that they could jeopardize either human health or the environment;
- Provide as-built plans of storm water drainage from the top of the landfill and make any necessary modifications to ensure that contaminants from within the landfill were not inadvertently being drained from the landfill to nearby areas of the forest preserve; and
- Maintain all components to ensure the continued operation of the systems in the short-term to prevent contamination of ground water from exceeding Maximum Contaminant Levels.

To date, all of these activities have been completed.

III. HIGHLIGHTS OF COMMUNITY PARTICIPATION

The U.S. EPA released a Proposed Plan for the final remedy for the Site for public review and comment on July 8, 1998. The Proposed Plan and supporting documents were placed in the information repositories at the U.S. EPA Region V Office, the Warrenville Public Library and the Nichols Library. A Proposed Plan Fact Sheet was mailed to everyone on U.S. EPA's mailing list and press releases were sent to local media. Notice of the availability of the Proposed Plan was also included in advertisements in the Warrenville Daily Herald and Warrenville Free Press. U.S. EPA held a public meeting on July 22, 1998, at the Warrenville Community Building. At this meeting, representatives of U.S. EPA provided background information on the Site, explained the Proposed Remedy, answered questions and accepted formal comments from the public on the Proposed Plan. U.S. EPA also accepted written comments during the comment period, which ran from July 10, 1998 to August 10, 1998. A response to all comments received during the public comment period is contained in the Responsiveness Summary, which is attached to this ROD.

IV. SCOPE AND ROLE OF RESPONSE ACTION WITHIN SITE STRATEGY

The overall strategy for cleaning up this Site includes a combination of early removal actions conducted under the 1996 AOC, along with contingent and long-term actions described in this final ROD. Removal authority is typically used when emergency situations arise or, as in the case of this Site, when discreet response actions can occur that are: 1) not technically complex, 2) do not require a lengthy planning period, 3) can result in an immediate risk reduction, and 4) the response action is fully consistent with the long-term remedial approach. The required response actions for this Site were not technically complex, a willing Responsible Party was present, and the required response actions could be efficiently and effectively addressed from both a cost and scheduling perspective. For these reasons, U.S. EPA, Illinois EPA and the FPD agreed to conduct early response actions as an integral part of the overall Site strategy for final remedy.

The most significant threat for this Site is leachate, which will continue to be collected, treated and sent off-Site for disposal. The rationale for treatment of leachate is that it has high concentrations of contaminants and presents a large threat for migration to ground water. The leachate has been initially addressed through early actions, however, the long-term component has not yet been addressed. This ROD will address the threat posed by leachate by adding long-term operation and maintenance requirements.

The lower level threats posed by this Site are landfill wastes, landfill gas, and contaminated ground water. These are considered low level threats due to the lower potential for direct exposure, lower toxicity and/or lower mobility. This ROD will address the low level threats of landfill waste and landfill gas through containment. Like the leachate, the landfill waste and landfill gas threats were initially addressed in early actions through cap improvements and the installation and interim operation of a passive landfill gas venting system. These low level threats will be addressed in the ROD through long-term operation and maintenance of the cap and the operation and maintenance of the passive landfill gas system. This ROD will address the low level threat posed by ground water by requiring additional response actions. Finally, this ROD will require contingencies for augmentation of the leachate and landfill gas systems, in the event the early action components, as currently designed, are incapable of meeting the long-term remedial goals of this ROD. This ROD will also include long-term monitoring and periodic remedy review requirements. The overall intent of this ROD is to incorporate all of the previous early response actions and, through the addition of the requirements of this ROD, address all remaining actual, potential, present and future risks associated with this Site.

V. SUMMARY OF SITE CHARACTERISTICS

As stated previously, the Site is an approximately 40-acre landfill. Due to the physical nature of the landfill, disposal has resulted in the contamination of ground water, soil, air, sediments and surface water. The following is a more detailed description of Site features, followed by a summary of the nature and extent of contamination from the sampling results of the RI and finally a discussion of the estimated risks posed by the contaminated media.

A. Geology and Hydrogeology

Geology

The geology of DuPage County consists of recent alluvial and Pleistocene glacial deposits overlying Silurian dolomite bedrock. The surficial deposits are predominantly the result of Wisconsin-age glaciation, with minor modifications by recent alluvial processes. Till Members of the Wedron Formation, and sand and gravels of the Henry Formation, are present in the area of the Site. The following unconsolidated stratigraphic units have been identified at the Site in ascending order: The Tiskilwa Till Member, the Maldern Till Member, the Yorkville Till Member, and the Batavia Member of the Henry Formation.

The unconsolidated stratigraphic sequence is variable across the Site in an east to west direction. This is due to the Site's location on the western edge of the West Chicago Moraine. The uppermost till unit present at the Site, the Yorkville Till Member, forms this moraine. Meltwater from the glacier that deposited the till appears to have formed a river which flowed north to south along the front of the moraine. Previously deposited glacial sediments were subsequently eroded and re-deposited as the Batavia Member outwash sands and gravels.

Hydrogeology

The hydrostratigraphic setting at the Site varies in an upgradient to downgradient (east to west) direction. Upgradient of the landfill, the following hydrostratigraphic units are present, in ascending order: the bedrock aquifer, the Malden/Tiskilwa Till aquitard, and the Yorkville Till aquitard. Downgradient of the landfill, the following units are found, in ascending order: the bedrock aquifer, the Malder/Tiskilwa Till aquitard, and the outwash aquifer. The landfill lies across the contact between the outwash aquifer and the Yorkville Till aquitard. Therefore, the outwash aquifer is not present upgradient of the landfill.

Two aquifers are present at the Site: the outwash aquifer, that has its eastern-most limit beneath the landfill, and the dolomite bedrock aquifer, which is present beneath the entire Site. These two aquifers are hydraulically connected downgradient of the landfill via the Malden/Tiskilwa Till aquitard.

The glacial outwash aquifer is a valley train deposit, consisting of coarse-grained sand and gravel, deposited by meltwater along the front of the West Chicago Moraine. In boring logs prepared for the Site, the aquifer is described as a brown to gray, fine to coarse sand, gravelly sand, or sand with gravel. The range of hydraulic conductivity values determined during the RI for this aquifer was 1.4 x 10^{-2} cm/sec to 6.4 x 10^{-2} cm/sec.

The surface water bodies present downgradient of the landfill exert considerable control on the ground water flow system within the outwash aquifer. The West Branch of the DuPage River, exhibits a generally consistent surface water elevation. Sand Pond and Pine Lake are hydraulically connected to the River via the outwash aquifer. The net effect of this hydraulic connection is a flattening of the horizontal gradient in the vicinity of the lakes, as the river's influence is propagated eastward. Spring Brook, located downgradient of the landfill, consistently loses water to the aquifer. This causes development of a zone of stagnation in ground water between the Spring Brook and Sand Pond. The flattening of the horizontal gradient within the outwash aquifer downgradient of the landfill serves to strengthen the vertical gradient between the outwash aquifer and bedrock aquifer. The flow path for the outwash aquifer is initially southwesterly from the landfill. As ground water approaches Spring Brook the flows bend more southerly. At the south end of the landfill near Spring Brook ground water flow is actually southeasterly toward Sand Pond and Pine Lake.

Characteristics of the dolomite aquifer were observed in rock cores obtained during the RI. The dolomite was light brown to light gray in color and hard. Fracture orientations noted in the cores were predominantly horizontal. Hydraulic conductivity values determined for the dolomite aquifer during he RI ranged from 7.1 x 10^{-6} cm/sec to 3.0 x 10^{-2} cm/sec.

Horizontal gradients within the bedrock aquifer are consistently in a southwesterly direction, toward the West Branch of the DuPage River.

B. Nature and Extent of Contamination

Source Areas

During the RI, samples were taken from the potential source areas and the potential migration pathways at the Site. The source areas included the landfill, leachate, landfill gas, and the media included ground water, surface water, soil, leachate, gas/air and sediment. Additionally, ground water from 51 private supply wells located off-site were sampled to assess potential impacts from Site related wastes.

The major source of this Site is the 40-acre landfill itself. The contents are the source of contaminated soil, migrating leachate, and landfill gas. Approximately 1.5 million cubic yards of refuse were disposed of at the Site between 1965 and 1973. The waste materials have been classified as general household refuse and light industrial waste. Historical records indicated that the users of the landfill were generally municipal waste haulers and scavenger companies from the area. An estimated three to four tons of waste was disposed of at the landfill per day. The refuse volume calculated including the interstratified daily cover is 1.9 million cubic yards.

Leachate volumes were estimated at 53 to 74 million gallons prior to the installation of the leachate extraction system. This estimate was based on leachate elevations measured at the vents at the time of the RI, with an assumed refuse porosity of 25 to 35 percent which may overestimate the leachate volume. Modeled leakage from the landfill was estimated between 3.5 million to 5.2 million gallons per year prior to cap improvement and implementation of leachate, and landfill gas extraction systems.

The total amount of landfill gas contained in the landfill is difficult to measure. However, measurements of gas flow at the landfill vents indicated a range in flow volume from a low of "no flow" to 15ft^3/min.

Ground water contamination as a source is described as a plume in the shallow aquifer. Ground water contamination at the Site at the time of the RI was mostly limited to the shallow outwash aquifer. The shallow aquifer plume began directly beneath the west half of the landfill (where the outwash aquifer begins) and continued west and southwest of the landfill until the shallow aquifer met surface water. The shallow aquifer is not present upgradient of the landfill. There were lower concentrations of contaminants found in the deeper ground water below and slightly southwest of the landfill footprint at the time of the RI.

Types of Analyses Conducted in the RI

From within the sources and potentially impacted media, a number of different types of analyses were conducted during the RI. The following is a summary of the type of analyses conducted.

Volatile Organic Compounds

- **Chlorinated alkanes** - Compounds within this group are common industrial solvents which represent a potential degradation sequence.

- **Chlorinated alkenes** - These compounds are also common industrial solvents which represent a potential degradation sequence.

- **Aromatics** - This group includes water soluble products from gasoline and other hydrocarbon products. Aromatic compounds are used as solvents and reagents for a variety of manufacturing processes.

- **Ketones** - Compounds within this group are common solvents, used in paints, cement adhesives, resins, and cleaning fluids.

Semivolatile Organic Compounds

- **Phenols** - These compounds are used in adhesives, epoxies, plastics and a variety of synthetic fibers and dyes.

- **Polynuclear Aromatic Hydrocarbons (PAHs)** - This group of compounds is associated with and derived from coal and oil, and the incomplete combustion of carbonaceous materials. Asphalt or blacktop are other common sources for PAHs.

- **Phthalates** - These compounds are associated with plastics and plastic making processes, and are common laboratory contaminants associated with sample containers.

- **PCBs** - Compounds within this group are mixtures of polychlorinated biphenyls identified and sold under the trade name Aroclors. Aroclors were formerly used extensively in industrial applications as non-flammable oils for high temperature applications.

Metals - Metals are discussed based on toxicity. Metals analyzed included:

- Non-regulated nutrients or low-toxicity metals

- RCRA-toxic metals

- Metals regulated by U.S. EPA Maximum Contaminant Levels (MCLs) or Illinois Ground Water Quality Standards.

The revised RI was completed in 1994, the following subsections summarize the results of this sampling by media.

A. Landfill Leachate

Organics - The organic chemicals detected in the 4 leachate samples included chlorinated alkanes and alkenes, aromatics and ketones. Ketones were found at the highest concentration (17,000 ug/L of 2-butanone). Significant concentrations of acetone (10,000 ug/L), and toluene (3,200 ug/L) were also found. Also, trichloroethene was found as high as 720 ug/L, which exceeds the RCRA Toxicity Characteristic Leaching Procedure limit. No Ketones were detected in any other media than the leachate.

Semivolatiles detected in leachate include phenols, phthalates and PAHs, the highest being 4-methylphenol found at 17,000 ug/L.

Select VOCs/SemiVOCs in leachate from the RI are presented in Table 1.

Table 1. Select VOCs and SemiVOCs in Leachate

Well Location	Volatile Organic Compounds	Concentration in (ug/L)	EPA TCLP
SV5	vinyl chloride	22	200
SV8	acetone	10,000	
SV5	chlorobenzene	28	100,000
DV5	ethylbenzene	130	
DV8	1,1 dichloroethane	180	
SV9	1,2 dichloroethene	480	
SV9	trichloroethene	**720**	500
SV9	tetrachloroethene	220	700
SV8	benzene	160	500
SV8	4-methyl-2-pentanone	1,100	
SV9	toluene	3,200	
SV9	xylenes	470	
SV8	2-butanone	17,000	
SV8	4-methylphenol	17,000	

Exceeds RCRA TCLP Waste Designation

Inorganics - Metals were detected in all of the leachate samples, at concentrations generally higher than found in ground water or surface water. Antimony and selenium were the only two metals that were tested for but were not detected in the leachate. The more significant regulated inorganics such as arsenic, barium, cadmium, chromium, lead, mercury and silver were all detected in the leachate samples. Maximum concentrations of 4.7 ug/L for mercury and 482 ug/L for lead were detected in the leachate. The other inorganics were detected, but were either at much lower levels, and/or were not regulatorily or environmentally significant. RCRA Toxicity Characteristic Leaching Procedure (TCLP) were not exceeded for any of the inorganics detected in leachate.

Table 2. Select Inorganics in Leachate

Location	Metal	Concentration (ug/L)	TCLP(ug/L)
SV9	iron	2.410.000	
DV5	arsenic	45.7	5000
SV9	sodium	1.200.000	
SV9	manganese	59.800	
SV9	lead	482	5000
SV9	cadmium	150	1000
DV5	chromium	144	5000
SV9	mercury	4.7	200
SV9	cyanide	13.0	

No pesticides or PCBs were detected in any of the leachate samples.

B. Landfill Gas

Landfill Gas - Similar contaminants were found in the landfill gas to those found in leachate. Compounds found in the landfill gas included BETX compounds (benzene, ethylbenzene,, toluene and xylene) and chlorinated solvents (trichloroethene, tetrachloroethene, trans-1,2-dichloroethene, cis-1,2-dichloroethene, and vinyl chloride). Other volatile compounds detected in landfill gases included freon compounds, acetone, methylene chloride, 4-methyl-2-pentanone, and 2-butanone. Toluene was detected at the highest concentration (92,000 ppbv).

There are no direct regulatory comparisons for landfill gas. However, although similar compounds were detected in the landfill gas and the leachate, the concentrations in the gas were generally higher than those in leachate. For example, the maximum vinyl chloride concentration was 22 ug/L in the leachate at SV5 and 21,000 ppbv in the gas at SV04 (note: all gas concentrations are expressed as ppb in air on a volumetric basis). Similar trends were observed in other compounds such as toluene in leachate at 3,200 ug/L and 92,000 ppbv in gas and tetrachloroethene at 220 ug/L in leachate and 17,000 ppbv in gas. Of the organic compounds detected, eight were found in landfill gas samples and not leachate. Table 3 is a select group of RI landfill gas results.

Table 3. Select Landfill Gas Results

Location	Compound	Concentration (ppbv)
SV04	vinyl chloride	21,000
SV08	methylene chloride	17,000
SV09	trichloroethene	28,000
DV10	tetrachloroethene	17,000
DV05	1,4-dichlorobenzene	7,300
SV02	benzene	2,700
SV08	toluene	92,000
SVO4	cis-1,2-dichloroethene	44,000

C. On-Site Soils

Soils - Thirteen soil samples were collected at ten locations during the Remedial Investigation (RI). Two samples were taken at three locations and one sample each at seven locations. Five of these samples were in background locations. The on-Site surface soil sampling included potential run-off areas, seep areas and landfill cover soil.

Organics - No volatile organic compounds were detected in soils except for low levels of 1,1,1-trichloroethane in two background samples. One sample from a leachate seep area indicated semivolatiles including benzo(b)fluroanthene and benzo(k)fluroanthene both at 580 ug/kg and one background sample detected semivolatiles. Also, one sample and its duplicate indicated 56 and 47 ug/kg PCBs at a depth less than 6 inches. No PCBs were detected at the next deeper interval.

Inorganics - In general, the highest metal concentrations were from soils thought to be in the drainage way west of the Swim Lake parking lot. However, with the exception of silver, all metals analyzed did not exceed 3-times background.

Table 4. Select Inorganics in Soils

Location	Metal	Concentration (mg/L)	Background
SS06	iron	24,300	21,140
SS03	arsenic	6.5	6.46
SS01	lead	36.7	24
SS01	chromium	70.8	28
SS01	mercury	0.19	0.08

No pesticides were detected in any of the surface soil samples obtained at the Site.

D. On-Site Ground Water

Ground Water Organics - Periodic ground water sampling began for this Site in the 1980's. Nineteen of the 23 downgradient wells sampled contained organic compounds, including chlorinated alkenes such as tetrachloroethene, trichloroethene, 1,2-dichloroethene and vinyl chloride and alkanes such as 1,1,1-trichloroethane, 1,1-dichloroethane, and chloroethane. In addition, the aromatic compound benzene was identified in 4 wells. The highest VOC concentrations were detected in shallow monitoring wells close to the landfill.

Of the 32 VOCs detected in leachate, only 9 were present in ground water. Select VOCs and SVOCs in ground water are presented in Table 5.

Table 5.	**Select VOCs and SVOCs in On-Site Ground Water**				
Location	**Volatile Organic Compound**	**RI Concentration (ug/L)**	**November 1997/98**	**MCL**	**IEPA Standard**
G127	vinyl chloride	**31.0**	**7.0**	2	2
G118S	1,1-dichloroethane	7.0	N/D		7
G118S	1,2-dichloroethene	**120.0**	21.4	70	70
G118S	1,1,1-trichloroethane	1.0	N/D	200	200
G118S	1,2-dichloropropane	3.0	N/D	5	5
G118S	trichloroethene	**18.0**	2.9	5	5
G138	benzene	**5.0**	N/D	5	5
G130	tetrachloroethene	**12.0**	N/D	5	5
G118	pyrene	1.0	N/D		210

Meets or exceeds Maximum Contaminant Level (MCL)
Meets or Exceeds IEPA Class I Drinking Water Standard

VOC concentrations in ground water have improved significantly over time, but there is one on-Site shallow well that still exceeds the regulatory standards. The highest concentrations were detected in monitoring wells directly downgradient of the landfill in the shallower outwash aquifer. Concentrations of total VOCs detected in the deeper bedrock aquifer have historically been much lower (10 ppb or less). Column 4 of Table 5 summarizes some of the results of the November 1997/July 1998 quarterly ground water sampling for comparison to the 1991/92 RI data. Figure 3 shows the estimated VOC plume (based on November 1997 data).

Inorganics in Ground Water - Although metals were detected in the shallow outwash aquifer, with the exception of iron and manganese, EPA Maximum Contaminant Levels (MCLs) were not exceeded. Iron and manganese concentrations in the shallow aquifer exceeded expected background levels, exceeded the EPA MCL secondary standard (the secondary standard is for drinking water aesthetics and not health) and the IEPA Class I Drinking Water Standards. Table 6 summarizes select on-Site metal samples. As illustrated in column 4 of Table 6, sampling in 1997 continues to show significant improvement but there are still exceedences of IEPA Class I Drinking Water Standards for iron and manganese in the shallow aquifer. Manganese and iron were also detected above background in five and three bedrock aquifer wells respectively. Current bedrock aquifer sampling indicated no exceedences of iron above the IEPA Class I Drinking Water Standards, but the U.S. EPA secondary standard was exceeded (secondary standards relate to the aesthetics of drinking water, i.e., taste and smell) for iron and the IEPA standards were exceeded for manganese.

Figure 3 - Plume Map

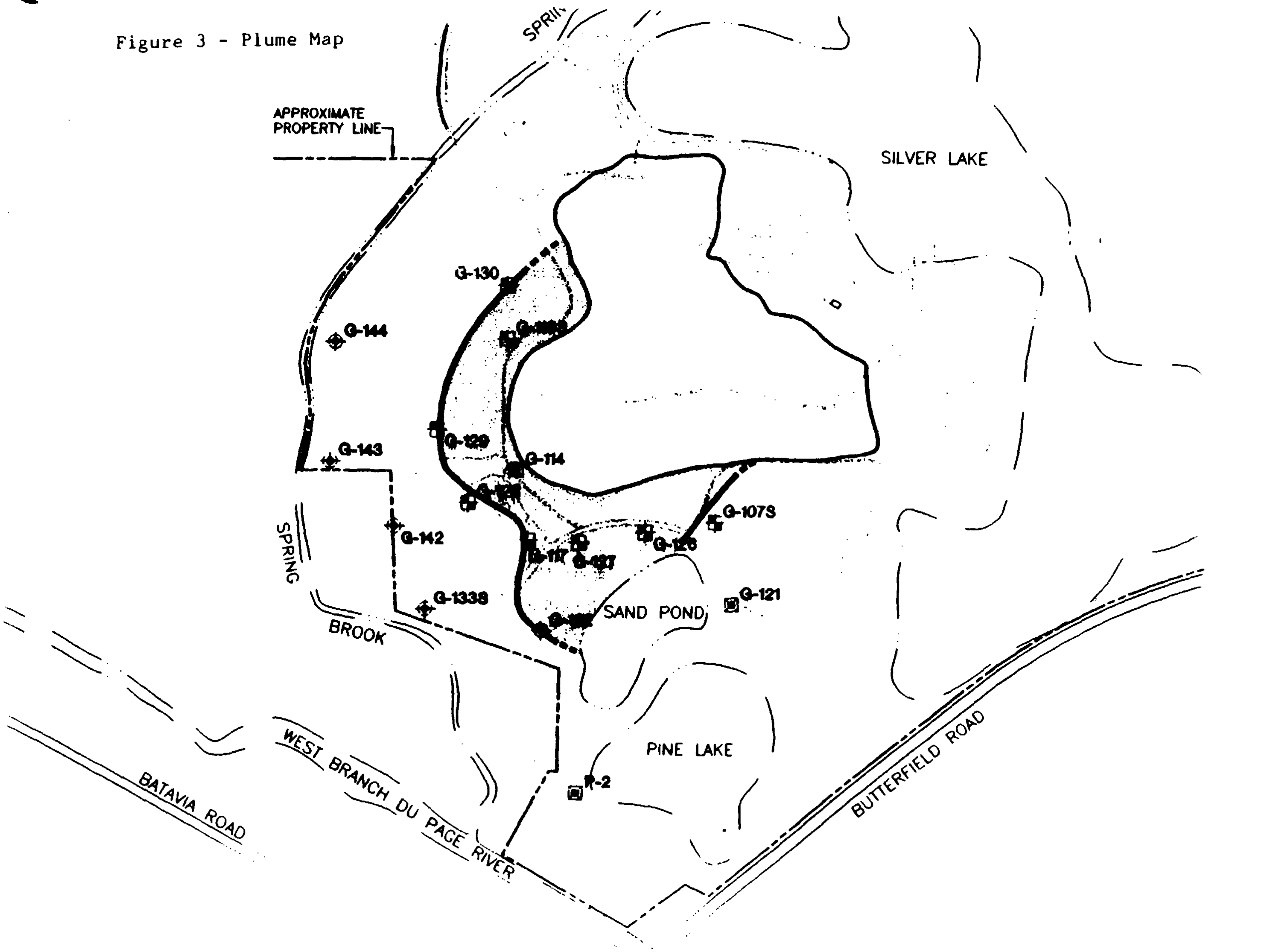


Table 6.	Select Metals in On-Site Ground Water				
Location	**Inorganic Compound**	**RI Concentration (mg/L)**	**November 1997 Data**	**EPA SMCL**	**IEPA MCL**
G-118	Manganese	*4.88*	*0.854*	0.05	0.15
G-127	Iron	*12.4*	*3.39*	0.3	5

Meets or Exceeds EPA Secondary MCL
Meets or Exceeds IEPA Class I Drinking Water Standard

Similar to the organics, metal concentrations in both the shallow and deep ground water are also clearly improving over time.

E. Private Wells

Organics - In addition to the wells sampled on-Site, 51 private ground water wells located both downgradient and upgradient of the Site were sampled. No semivolatiles or PCBs were detected. The VOCs 1,1-dichloroethane and cis-1,2-dichloroethene were detected in 15 private wells, however the concentrations were very low (0.6 to 2 ppb). There is no regulatory standard for 1,1-DCA and the standard for 1,2-DCE is 70 ppb, indicating that these concentrations are well below the regulatory standard. It is speculated that the low level VOCs may be a result of cleaners disposed of in nearby septic systems.

Inorganics - As anticipated, some levels of background inorganics were detected in all private wells. Arsenic, lead, zinc manganese, iron and calcium concentrations were the significant inorganics. Arsenic was detected in 14 of the 51 downgradient wells but at levels below the MCL. Arsenic concentrations downgradient of the Site were not significantly different than upgradient concentrations.

Lead and zinc were detected in several private wells, but at levels higher than Site monitoring wells. This suggests that these metals may have been a result of the private water systems.

Manganese was detected in 24 of the 51 downgradient private wells and 5 upgradient wells. The SMCL was exceeded in eight downgradient wells for manganese. This indicates a potentially high background concentration of manganese.

Iron concentrations were present in 44 of the 51 downgradient wells and all 5 upgradient wells exceeded the State Drinking Water Standard. This indicates high background concentrations of iron.

Several trace pesticides were detected in samples that were not detected in any Site media. These pesticides may have been a result of laboratory contamination.

F. Surface Water

Surface water samples were taken from Silver Lake, Pine Lake, Sand Pond, Spring Brook and at off-Site background locations.

Organics - No organic compounds were found in any of the surface water samples.

Inorganics - Samples from Silver Lake contained concentrations of arsenic, mercury, copper, calcium, magnesium, potassium and sodium. However, the concentrations were less than two times other background samples. Aluminum, lead and manganese were found in Silver Lake, but not in the background samples. Barium and iron were detected at concentrations greater than two times background concentrations.

Surface water samples from Pine Lake indicated the presence of inorganics, but only manganese was present at concentrations greater than background.

Analysis of surface water samples from Sand Pond included barium, manganese, calcium, iron, magnesium and sodium. The concentrations were present at greater than two-times other background samples.

The highest concentrations of inorganic constituents detected in surface water were found in Spring Brook. However, these concentrations are not believed to be related to the landfill, since Spring Brook receives wastewater effluent upstream of the landfill, is subject to upgradient surface water run-off, and is a losing stream to ground water.

G. Sediment

No pesticides or PCBs were detected in any of the sediment samples.

Organics - The only VOCs detected in sediment samples were from Sand Pond. The VOCs detected were vinyl chloride (5 ug/kg) and 1,1-dichloroethane (3 ug/kg). SVOCs were detected in both background sediment samples and samples potentially impacted by Site run-off. Site samples generally contained higher concentrations of SVOCs than were found in background samples.

Inorganics - Sediment samples from the Site lakes generally contained metals at concentrations less than two times other background samples. While metals were detected in the downstream sample from Spring Brook at greater than two times the concentrations detected in the upstream sample, these elevated concentrations are not attributed to the landfill. Spring Brook discharges to the water table downgradient of the landfill and receives wastewater influent and surface water run-off upstream of the landfill.

C. Current and Potential Future Site and Resource Uses

Present and Future On-Site Land Use - The current on-Site land use is now and, for the past 20 plus years, has been recreational. Future land use changes are prohibited by the Forest Preserve District Charter across the entire Forest Preserve and specifically in the area of the landfill by EPA-required deed restrictions from the AOC. The FPD will continue to manage the entire Forest Preserve surrounding the landfill recreationally and prohibit any other use, in perpetuity. Therefore, potential future land use changes on-Site are not considered reasonable.

Present and Future Off-Site Land Use - Because the landfill is part of an approximately 1200-acre Forest Preserve, the only adjacent land use of significance is west of Spring Brook due to its proximity to the landfill. This area is now, and for the purpose of future use considerations, will be assumed to be residential. There is no real likelihood of future use changes on-Site that would increase exposure to adjacent property to Site soils, sediments, leachate, landfill gas, or surface water. Therefore, off-Site future use will be discussed only to the extent ground water threatens to migrate.

Present and Future On-Site Ground Water Use - Similar to the present and future land use, the ground water use is restricted on-Site. The Forest Preserve Charter restricts residential development which indirectly restricts residential ground water use on-Site. Further, deed restrictions specifically prevent installation of wells in the area of the landfill. It is reasonable to assume that these restrictions will last in perpetuity. Although ground water use is restricted, by definition, the State of Illinois considers this ground water to be Class I Drinking Water and EPA requires restoration of ground water to its beneficial use. Ground water on-Site directly down gradient from the landfill exceeds both the EPA MCLs and the IEPA Class I Drinking Water Standards. For this reason, the ground water remedy will be required to meet these standards in a reasonable time-frame.

Present and Future Off-Site Ground Water Use - There are private wells currently in use both east and west of Spring Brook. On-Site ground water is classified by the State of Illinois for use as Class I drinking water. This is the most conservative classification, has the most stringent standards, and represents the most reasonable future use protection. As with the on-Site ground water, EPA MCLs also apply to off-Site ground water. Currently, contamination in the shallow aquifer near the landfill foot print has exceedences in both VOCs and metals. There is a 300-600 foot buffer of shallow ground water between the landfill and Spring Brook where there are exceedences of the EPA Secondary MCL for iron and manganese but below any EPA primary MCL. However, the shallow aquifer does not flow off-Site due to the Spring Brook hydrologic boundary. Finally, in addition to the buffer zone and hydrologic boundary, the deeper aquifer supplies water to the vast majority of private wells.

Deep ground water does flow toward the adjacent private wells, but does not contain Site related VOC contamination. Metals present in on-Site deep ground water exceed the State Class I Drinking Water standards, but are not significantly greater than upgradient samples. Some manganese and/or iron concentrations exceed the EPA secondary standards in the deep aquifer at the Site boundary. However, secondary standards are for drinking water aesthetics (i.e., taste and smell) and do not present health risks. The deeper aquifer exceeds the EPA secondary standard for total dissolved solids, which is not thought to be related to the Site. At the present time, both manganese and iron at the Site boundary are currently not significantly higher than upgradient concentrations.

VI. SUMMARY OF SITE RISKS

A. Human Health Risks

CERCLA requires that U.S. EPA protect human health and the environment from current and potential exposure to releases of hazardous substances at or from the Site. As part of the RI, a Baseline Risk Assessment was required to assess the current and potential future risks posed by the Site. The Baseline Risk Assessment determines whether contamination at the Site could pose an unacceptable health risk or environmental risk, in the absence of any remedial action. Potential threats to public health are estimated by making assumptions about the manner, frequency, and length of time a person could be exposed to Site-related contaminants.

All chemicals identified in Site media were evaluated: soil, ground water, surface water, sediments, gas and leachate. Each sample was assessed by evaluating data qualifiers and blank sample concentrations. The RI data from each media was evaluated to select Contaminants of Potential Concern (CPCs). CPCs are those chemicals present at the Site most likely to be of concern to human health and the environment. CPCs were selected based on a comparison of contaminants found in each media to background and blank sample data for each media. Table 7 summarizes the CPCs selected for each media from the RI. Based on the results of the RI, U.S. EPA directed the PRPs in calculating the risks that the Site would pose to human health and the environment if no remedial actions were taken.

The risk assessment process involves assessing the toxicity, or degree of hazard, posed by the substances found at the Site, and the routes by which humans and the environment could come into contact with these substances. There are some uncertainties inherent in the assessment. The primary sources of uncertainty in the preparation of a risk assessment are:

- Problems with environmental sampling and analysis, and selection of chemicals;
- Exposure parameter estimation;
- Toxicity values may over or under-estimate risk (especially animal studies extrapolated to humans);
- Behavioral patterns cannot be predicted with certainty, and

Table 7
Contaminants of Potential Concern by Medium
Blackwell Landfill Site
DuPage County, Illinois

Analytes	LF Gas	Private Wells								
			Silver Lake	Sand Pond	Pine Lake	*Silver Lake*	*Sand Pond*	*Pine Lake*	Land-fill	Ditch
VOLATILES										
Chloromethane	X									
Vinyl chloride	X						X			
Chloroethane	X									
Methylene chloride	X									
Acetone	X									
Carbon disulfide							X			
1,1-Dichloroethene	X									
1,1-Dichloroethane	X	X					X			
1,2-Dichloroethene (cis)	X	X								
1,2-Dichloroethene (trans)	X									
2-Butanone	X									
1,2-Dichloropropane	X									
Trichloroethene	X									
Benzene	X									
4-methyl-2-pentanone	X									
Tetra-chloroethene	X									
Toluene	X									
Chlorobenzene	X									
Ethylbenzene	X									

Xylenes (mixed)	X									
Dichlorodiflurometh hane	X									
Dichlorotetra fluormethane	X									
Trichlorofluro methane	X									
Trichlorotri fluroethane	X									
4-Ethyltoluene	X									
1,3,5,-Tri methylbenzene	X									
1,2,4-Tri methylbenzene	X									
SEMI VOLATILES										
1,4-Dichloro benzene	X									
Acenaphthene							X			
Fluorene							X			
Phenanthrene						X			X	
Anthracene						X				
Fluoranthene						X			X	
Pyrene						X			X	
Butyl benzylphthalate						X				
Benzo(a) anthracene						X			X	
Chrysene						X			X	
Benzo(b) fluoranthene						X			X	
Benzo(k) fluoranthene						X			X	

Benzo(a)pyrene						X			X	
Analytes	LF Gas	Private Wells								
			Silver Lake	Sand Pond	Pine Lake	*Silver Lake*	*Sand Pond*	*Pine Lake*	Land-fill	Ditch
Indeno(1,2,3-cd)pyrene						X			X	
Dibenz(a,h) anthracene						X				
Benzo(g,h,i) perylene						X			X	
PESTICIDES/ PCBs										
Dieldrin		X								
4,4'-DDE		X								
Endrin		X								
4,4'-DDD		X								
PCB		X								X
Endrin Aldehyde		X								
METALS										
Aluminum			X							
Antimony		X					X			
Arsenic								X		
Barium			X	X		X	X	X		
Calcium										
Copper							X			
Iron										
Lead			X			X				
Magnesium										

Manganese			X	X	X					
Nickel		X								
Potassium		X								
Analytes	LF Gas	Private Wells								
			Silver Lake	**Sand Pond**	**Pine Lake**	*Silver Lake*	*Sand Pond*	*Pine Lake*	Land-fill	Ditch
Selenium										X
Silver		X							X	
Sodium		X		X						
Zinc						X	X			
TIC GROUP										
Acids, cyclic										
Acids, non-cyclic				X						
Alcohols, cyclic										
Alcohols, oxygenated										
Ethers, cyclic			X							
Amines										
Benzenes, ethyl methyl										
Benzenes, halogenated										
Benzenes, oxygenated						X			X	
Benzenes, propyl										
Benzenes, trimethyl										
Hydrocarbons, branched		X								

Hydrocarbons, cyclic		X								
Ketones, cyclic										
Pyridines, substituted										
Phenols, substituted										
PAHs, non-TCL									X	
Furans										
Sulfides						X				

Notes
Refer to Section 8.2 of the RI report for a description of the method used to select chemicals of potential concern. It should be noted that a chemical does not necessarily pose a health concern just because it was selected as a Contaminant of Potential Concern. Rather, based on the chemical concentration, it was considered to be elevated above normal levels for the area (i.e., background), and therefore was considered a chemical of potential concern to be evaluated within the risk assessment. Essential nutrients (calcium, magnesium, iron, potassium), even if elevated above background concentrations, were not considered chemicals of potential concern because of their low toxicity.

Legend
LF - Landfill
TIC - Tentatively Identified Compound

- Models used to predict environmental fate and transport may over or underestimate risk.

The Baseline Risk Assessment evaluated current and future potential human health or environmental risks associated with the Site. The qualitative risk assessment examined contaminants detected in ground water and soils during the field investigation phase of the RI. These contaminants were evaluated with respect to their carcinogenicity, toxicity, and possible exposure pathways from and at the Site.

In order to conduct a conservative evaluation of the risks posed by the Site, a number of critical assumptions were made, including the following:

- No corrective action will take place;
- There are no ground water restrictions;
- There is no potential for future development of the Site;
- The area around the surrounding the Site will be residential;
- The contaminant concentrations in the various media will not to change over time;
- The Site is adequately characterized;
- The Contaminants of Potential Concern are associated with the majority of Site health risk; and
- Risk/dose within an exposure route are additive.

With knowledge of the risk assessment uncertainties and assumptions, the first step in the risk assessment process is to determine which chemicals are of concern to human health. To determine this, a comparison of the concentrations of the chemicals detected in each media and in areas potentially impacted by the landfill, is made to concentrations of chemicals in the same media collected in areas not impacted by the landfill (commonly called "background"). This comparison was made to determine which chemical concentrations in each media were significantly elevated above background. The chemicals detected above background are considered to be the Contaminants of Potential Concern. Health risks are calculated for each Contaminants of Potential Concern. Based on this analysis, it was determined that there were Contaminants of Potential Concern in sediment and surface water samples from Silver Lake and Sand Pond and in soil samples collected on the landfill. There were also Contaminants of Potential Concern in the air (based on modeling of landfill gas emissions), and in private well samples. While no tissue samples were analyzed from fish in the Site lakes, it was conservatively assumed that fish may contain certain Contaminants of Potential Concern detected in the Silver Lake sediment samples.

The second step was to determine pathways of exposure, based on current land use conditions, and the characteristics of contamination at the Site. Activity assessments were conducted of Blackwell Forest Preserve recreational users and employees. These surveys were performed to determine how frequently, and for what duration, each of these populations were likely to be in an area where it was likely that they would be exposed to any Contaminants of Potential Concern in all medias (i.e., sediment, surface water, soil, ambient air and fish). In addition, demographic information was collected on residents living near the landfill. Information on the duration of time residents normally live at a residence was determined from national statistics. Residents living near the landfill, in the downgradient direction of ground water flow, were conservatively considered to be exposed to Contaminants of Potential Concern in the air and in private well water. Based on the activity assessments and national statistics, and the concentration of Contaminants of Potential Concern in media, estimates of chemical exposure were calculated for each population.

Risks were quantitated for those potentially exposed subpopulations to represent a Reasonable Maximally Exposed population (RME population), rather than each exposed subpopulation. The reasonable maximally exposed subpopulation represents the subpopulation that, for reasons of their sensitivity, and/or lifestyle, have the greatest potential for exposure proportional to the level of human exposure. This RME population is considered to be the most likely group potentially affected by contamination at the Site. The current and future land use health risks association with exposure to contaminated media were evaluated for:

- Recreational users;
- Trespassers;
- Employees; and
- Off-Site residents.

Toxicity information was compiled for each Contaminants of Potential Concern. Individual chemicals were separated into two categories of chemical toxicity, based on whether they exhibited principally noncarcinogenic or carcinogenic effects. Next, the health effects of both categories of chemicals were evaluated. Known or suspected carcinogens and non-carcinogens were addressed independently.

The risk characterization integrates the exposure and toxicity assessments into a measurable expression of risk for each exposure scenario. The cancer risk is expressed as a probability of a person developing cancer over the course of his or her lifetime. Cancer risks from various exposure pathways are assumed to be additive. Excess lifetime cancer risks less than $1x10^{-6}$ (one-in-one million) are considered acceptable by U.S. EPA. Excess lifetime cancer risks between $1x10^{-4}$ (one-in-ten thousand) to $1x10^{-6}$ require U.S. EPA and Illinois EPA (the Agencies) to decide if remediation is necessary to reduce risks and to what levels cleanup will occur. Excess lifetime cancer risks greater that $1x10^{-4}$ generally require remediation.

For noncarcinogens, potential risks are expressed as a hazard index. A hazard index represents the sum of all ratios of the level of exposure of the contaminants found at the Site to that of contaminants' various reference doses. In general, hazard indices which are less than one are not likely to be associated with any health risks. A hazard index greater than one indicates that there may be a concern for potential health effects resulting from exposure to noncarcinogens. Table 8 summarizes the total risk for all projected users and a theoretical Maximally Exposed Individual (MEI).

Table 8. Health Risk estimates

User	Noncancer RME	Noncancer Ave.	Cancer RME	Cancer Ave.
Recreational	$3x10^{-2}$	$4x10^{-4}$	$1x10^{-6}$	$1x10^{-8}$
Trespasser	$2x10^{-2}$	$3x10^{-4}$	$1x10^{-10}$	$5x10^{-13}$
Employee	$4x10^{-2}$	$1x10^{-3}$	$1x10^{-6}$	$2x10^{-8}$
Off-Site Resident	$9x10^{-1}$	$5x10^{-1}$	$3x10^{-6}$	$4x10^{-7}$
MEI	$9x10^{-1}$	$5x10^{-1}$	$4x10^{-6}$	$4x10^{-7}$

MEI - Maximally Exposed Individual

A shown in Table 8, under the current and reasonable future use conditions, the excess lifetime cancer risks were estimated at or below the 10^{-6} cancer range and several orders of magnitude below the 10^{-4} cancer risk. The Maximally Exposed Individual (MEI) was well below the acceptable risk range of 10^{-4} to 10^{-6}.

The excess cancer risk for the Reasonable Maximum Exposure (RME) to the Maximally Exposed Individual (MEI) is $3x10^{-6}$ to $4x10^{-6}$ for the most at risk off-Site resident. However, the $3x10^{-6}$ in off-Site resident total cancer risk is largely due to traces of pesticides found in 5 of 51 off-Site residential wells. Pesticides were not found in leachate samples or monitoring wells around the landfill and the pesticides are believed to be from past agricultural land use or laboratory artifacts.

The non-cancer hazard index for the RME to the MEI is 0.9. While this is very close to 1, 93% of the noncancer health risk is associated with antimony exposure from one off-Site residential well. The antimony (and lead) in this well is believed to be from the home's water distribution system, not from the landfill.

B. Ecological Risks

An ecological assessment was conducted to evaluate the potential risks to non-human receptors associated with the Site. Potential receptors and exposure pathways were evaluated, including the presence of endangered or threatened species in the area. The objectives of the ecological assessment was to:

- Characterize the natural habitats and populations on and in the vicinity of the Site (ecological communities):
- Identify those habitats and populations that may be influenced by the Site; and
- Evaluate actual or potential adverse effects that chemicals from the Site may have on these habitats and populations.

Ecological inventory information was reviewed and the Site was inspected for signs of adverse ecological effects. Environmental media were sampled and analyzed to determine if chemicals which could adversely affect ecological communities at the Site were present. To derive an indication of what compounds or chemicals would be most likely to represent a risk to the environment, conservative values for chemical toxicity and biotic uptake were used to indicate potential biotic effects from detected Contaminants of Potential Concern. The results of these analyses are:

- There appears to be little risk to ecological communities and or populations in those communities at the Site from organic chemicals in environmental media, since the organic species were either not detected (pesticides), detected at few locations and at very low concentrations (VOCs), were not Site related (SVOCs), or were determined to be present at concentrations below which adverse ecological effects are associated (SVOCs and PCBs in the terrestrial environment);
- Metals are Contaminants of Potential Ecological Concern in some sediment samples. However, metals concentrations of potential concern are limited to isolated areas;
- Metals of potential ecological concern in Site surface soils appear to be present in concentrations lower than those sufficient to affect small terrestrial mammal populations;
- Contaminants of Potential Ecological Concern at concentrations detected in surface water do not appear to pose and ecological hazard to aquatic species in Silver Lake and Sand Pond;
- Possible risk from SVOCs in sediment exist in sediment at one isolated location in Silver Lake. This location is near an asphalt parking lot. It is possible that the SVOCs are from the parking lot, not the Site; and
- Sampling, analytical, and statistical uncertainties affect the Ecological Assessment. Application of limited reference data, assumptions on the size, range and feeding rates of species, and influences at the Site, other than influences from Contaminants of Potential Concern, also introduce uncertainties into the Ecological Assessment.

C. Remedial Objectives

As stated previously, there have been a number of early actions completed under CERCLA removal authority that addressed contamination on an interim basis. The following is a description of the final remedial objectives for this Site in light of the previously completed response actions.

Landfill Cap - The long-term remedial objective for the cap is to minimize infiltration into the landfill, and eliminate potential direct exposure to leachate, landfill gas, and contaminated soil/waste material within the landfill. As stated previously, a study was completed to determine the extent of refuse, determine the extent of a minimum of 2 feet of low permeability materials above that refuse, and make any required improvements to the cap. The study was completed and the cap improvements have been completed. Compliance with long-term Post Closure Care requirements of Illinois Administrative Code under IAC 35 807 and 811 for the cap are the critical ARARs for this objective.

Leachate System - The critical objective is to manage the threat of the leachate migration and exposure through a requirement for active collection and off-Site treatment and disposal. As described previously, nine extraction wells were placed into the landfill. The intent of the leachate collection system was to install a sufficient number of extraction wells to capture leachate throughout the landfill. The leachate system was designed to minimize leachate seeps out of the landfill, eliminating any potential for direct exposure, and to protect against leachate migrating to ground water that results in an exceedence of regulatory standards. The leachate system is designed so that if in the future it is determined to be insufficient in meeting these objectives, it can be readily upgraded. Long-term operation of the leachate collection, storage system with off-Site disposal will require compliance with Illinois Administrative Code for Post-Closure requirements (35 IAC) and the National Pollutant Discharge Elimination System (NPDES) permit (40 CFR 122 and 125) for leachate disposal. Augmentation of the system will require compliance with Illinois Administrative Code (35 IAC) and OSHA construction requirements.

Landfill Gas System - The objective of the landfill gas system is to appropriately manage landfill gas to minimize migration into ground water or through the cap. By reducing gas buildup beneath the cap, it is anticipated that full recreational use of the hill can be maintained. A landfill gas system was installed concurrently with the leachate extraction system and is up and running. The landfill gas system is also flexible so that if in the future it is determined to be insufficient in meeting these objectives, it can be augmented. Long-term operation will require compliance with Illinois Administrative Code (35 IAC) Post-Closure requirements for Landfill Gas Management and the Clean Air Act. Augmentation of the system will require compliance with Illinois Administrative Code (35 IAC) and OSHA construction requirements.

Ground Water - The remedial objective for ground water is to restore all ground water beyond the landfill boundaries to its maximum beneficial use in a reasonable amount of time. This objective will be measured against the Safe Drinking Water Act EPA MCLs and IEPA Class I Drinking Water Standards.

Long-term Monitoring - The objective of the long-term monitoring is to ensure no unacceptable exposure through long-term remedy performance. Long-term monitoring will be subject to Illinois Administrative Code (35 IAC) Post-Closure Requirements.

Institutional Controls - Another important remedial objective for long-term Site management is to restrict any activities that would interfere with the remedy.

VII. DESCRIPTION OF ALTERNATIVES

The following is a discussion of remedial alternatives developed and evaluated for the Site. One of the four remedial alternatives is the "no action" alternative and the other three require further response actions. The NCP requires that a no-action alternative be considered at every Site. The no-action alternative serves primarily as a point of comparison for other alternatives. These alternatives were developed from applicable remedial technology process options and are, evaluated for effectiveness, implementability and cost. The alternatives meeting these criteria were evaluated and compared to the nine criteria required by the NCP. Treatability studies were not performed in support of this remedy decision and are not anticipated to be a necessary part of implementation of any of the alternatives for this Site.

SOURCE CONTROL ALTERNATIVES

Common Components

Due to fact that a number interim actions have occurred at the Site, all alternatives include the following components completed in the early action.

1. Institutional Controls

Institutional controls include fencing, deed restrictions, and warning signs. Site access is controlled by a fence and warning signs to discourage unauthorized entry onto the Site. Deed restrictions have been instituted to prohibit disturbance of the Site and preclude future development of the Site.

2. Flood Protection

Erosion control measures were completed during early action construction to ensure the reduction of flood water velocity during future flooding.

3. Storm Water Controls

Storm water control measures were completed during the early action to control storm water (i.e., runoff control berms, engineered slope, discharge ditches).

4. Improved Landfill Cap

An improved landfill cap was constructed over parts of the landfill where insufficient low permeability materials were present, in accordance with the applicable Illinois EPA's Solid Waste Management Regulations. The landfill improvements prevent direct contact with the waste, prevent migration of contaminated soils into surface water, reduce infiltration of precipitation into the landfill thereby reducing generation of leachate and also aid in reducing the percolation of leachate from the landfill into ground water. There will be no additional cap construction under the proposed final Site-wide remedy.

5. Ground Water Monitoring

A ground water monitoring network was established on the Site using existing monitoring wells and the construction of 5 new monitoring wells to monitor upgradient and downgradient ground water conditions.

6. Gas Collection

Landfill gases are being collected with passive gas extraction wells. Landfill gases are collected from the extraction well locations and vented at the top of Mt. Hoy.

7. Leachate Extraction

Leachate is currently being extracted from the landfill. A series of 9 vertical extraction wells were installed in the landfill and screened in the permeable water-bearing zones. Leachate is collected by a system of piping buried under the landfill cap and is temporarily stored in a 10,000 gallon holding tank.

8. Leachate Treatment

The leachate treatment system includes off-Site transport to a permitted treatment system capable of treating the appropriate contaminants (i.e., volatile organic compounds, semivolatile organic compounds, and metals).

The following is a list of the technologies evaluated and a discussion of the alternatives to be added to the activities previously completed and described above.

Alternative 1 - *No Action*

Description: No Action

Estimated Capital Cost:	$0
Estimated Annual O&M Costs:	$0
Estimated Present-Worth Costs:	$0
Estimated Implementation Time frame:	None

The inclusion of the No-Action Alternative is required by law to give U.S. EPA a basis for comparison. This Alternative does not take any action to remediate the Site and does not consist of any treatment components, engineering controls, monitoring, or institutional controls. This Alternative involves no remedial measures and would not effectively (1) prevent migration of leachate to ground water (possibly resulting in exceedences of regulatory standards), (2) reduce the volume of leachate, (3) control landfill gas emissions, or (4) eliminate the potential for direct exposure. The majority of Remedial Action Objectives would not be met with this Alternative.

Alternative 2 – *Long-Term Leachate Extraction and Off-Site Disposal; Contingent Augmentation of the Leachate and Landfill Gas Systems; Long-term O&M for all Existing Components, and Long-term Monitoring*

Estimated Costs:

Capital Costs:	
Contingent Leachate System	$270,000
Contingent Gas	$ 20,000
CONTINGENT CAPITAL COSTS	**$290,000**
Operation and Maintenance Costs:	
Leachate O&M	$ 94,000
Cap O&M	$ 2,400
Landfill Gas O&M	$ 3,600
Monitoring	$299,000
ANNUAL O&M	**$399,000**

NET PRESENT WORTH	**(29 years at 7%)**	**$5,739,000**
	(29 years at 3%)	**$8,497,000**

Estimated Time-frame: Extraction and off-site disposal of leachate, landfill gas management, O&M and monitoring would be ongoing responsibilities.

This Alternative includes long-term operation and maintenance of all of the early action components, including: leachate extraction and off Site disposal, landfill gas management, cap

/institutional controls maintenance and long term monitoring of leachate, landfill gas and ground water, as appropriate. In addition, this Alternative also includes contingencies for the augmentation of the leachate extraction system with up to 9 additional leachate/landfill gas extraction wells and transition from passive to active landfill gas collection with thermal treatment.

Ground water under the Site would not be addressed under Alternative 2 as required by 35 IAC 620.250. Gas venting would be in compliance with 35 IAC 218.

Contingent augmentation of the leachate and landfill gas systems, if necessary, would be in compliance with OSHA construction requirements, 35 IAC 811.309 requirements for leachate treatment and disposal systems, and 35 IAC 811.311 for landfill gas management systems. If a thermal flare is constructed on -Site, monitoring under 35 IAC 212-218 would be required.

Monitoring of leachate, landfill gas and ground water would all be in accordance with an approved Operation and Maintenance (O&M) Plan and 35 IAC Post-Closure Care Requirements.

Alternative 3 - *Long-term Leachate Extraction and Off-Site Disposal; Contingent Augmentation of the Leachate System and Landfill Gas Systems; Long-term O&M for all Existing Components; Long-term Monitoring, and Monitored Natural Attenuation for Ground Water*

Estimated Costs:

Capital Costs:	
Contingent Leachate System	$270,000
Contingent Gas	$ 20,000
CONTINGENT CAPITAL COSTS	**$290,000**
Operation and Maintenance Costs:	
Leachate O&M	$ 94,000
Cap O&M	$ 2,400
Landfill Gas O&M	$ 3,600
Monitoring	$ 299,000
ANNUAL O&M	**$399,000**
Monitored Natural Attenuation Costs:	
Baseline Study	$ 55,000
Additional Monitoring	$ 25,000
TOTAL MNA COST	**$ 80,000**

NET PRESENT WORTH	**(29 years at 7%)**	**$5,819,000**
	(29 years at 3%)	**$8,577,000**

Estimated Time-frame: Extraction and off-site disposal of leachate, landfill gas management, O&M and monitoring would be ongoing responsibilities. MNA would be shorter-term requirements with the bulk of the work being conducted in the first five years.

Contingent augmentation requirements of the leachate and landfill gas systems in alternative 3 are the same as in Alternative 2. In fact, alternative 3 includes all the components of Alternative 2 with the addition of Monitored Natural Attenuation for ground water. Monitored Natural Attenuation includes an initial comprehensive baseline investigation and periodic sampling to compare projected contaminant concentrations and actual analytical data to measure clean up progress. The Monitored Natural Attenuation of ground water may include varying combinations of biodegradation, abiotic transformations, intrinsic bioremediation, dilution, dispersion and adsorption of ground water contaminants. Preliminary analytical data strongly support the projected success of MNA to meet cleanup goals in a reasonable amount of time. Order of magnitude decreases in ground water contaminants have been documented from 1992 sampling compared to the results of the 1997/98 data. It is reasonably expected that once the other components of the remedy have been in place for a while, significant additional improvements in ground water quality will be realized. To document this anticipated improvement in ground water quality, significant additional monitoring and modeling will be required. This type of monitoring is more comprehensive than monitoring intended to ensure the effectiveness of the remedy. Ground water under the Site would be managed as a ground water management zone in accordance with 35 IAC 620.250 until Class I potable resource ground water standards listed in 35 IAC 620.410 are met.

Alternative 4 - *Long-term Leachate Extraction and Off-Site Disposal; Contingent Augmentation of the Leachate System and Landfill Gas Systems; Long-term O&M for all Existing Components; Long-term Monitoring, and Ground Water Extraction and Treatment Construction/Operation.*

Estimated Costs:

Capital Costs:	
Contingent Leachate System	$270,000
Contingent Gas	$ 20,000
CONTINGENT CAPITAL COSTS	**$290,000**
Ground Water Pump and Treat	$726,000
TOTAL CAPITAL COST	**$1,016,000**
Operation and Maintenance Costs:	
Leachate O&M	$ 94,000
Cap O&M	$ 2,400
Landfill Gas O&M	$ 3,600
Monitoring	$299,000

Ground Water		$ 83,000	
ANNUAL O&M		**$482,000**	
NET PRESENT WORTH	**(29 years at 7%)**		**$7,553,813**
	(29 years at 3%)		**$10,923,813**

Estimated Time frame: Extraction and off-site disposal of leachate, landfill gas management, O&M and monitoring would be ongoing responsibilities. The actual design/construction of the ground water pump-and-treat system would be complete in about 3.5 years.

Contingent augmentation of the leachate and landfill gas systems are the same as in Alternatives 2 and 3. Alternative 4 includes all of the components of Alternative 3, with the exception of the Monitored Natural Attenuation. This Alternative replaces the Monitored Natural Attenuation with ground water extraction and treatment. This would involve installing 20 ground water extraction wells in the upper aquifer downgradient of the landfill to capture contaminants which have the potential to migrate off Site. The extracted ground water would be conveyed through underground piping to a treatment system. Following treatment to remove volatile organic compounds, the treated ground water would be discharged in compliance with a Illinois Administrative Code and NPDES permit (40 CFR 122 and 125) requirements. A pre-design investigation may be necessary to develop the appropriate configuration of ground water extraction wells.

PERIODIC REVIEWS/CONTINGENCIES FOR CLEANUP ALTERNATIVES

Alternatives 2, 3 and 4 will require a critical review after the completion of one year of operation (at a minimum) of the early action. The purpose of the critical review is to determine whether the leachate system and/or landfill gas system augmentation will be required. If data demonstrates that the leachate system is not effective in managing leachate such that it poses a direct exposure threat, or ground water would not be remediated in a reasonable amount of time, up to 9 additional extraction wells would be added. If the data indicate that the landfill gas system is not effective at managing gas, it may be transitioned to active gas collection and require on-Site thermal treatment. Prior to, or at the time of, these critical reviews it may be determined that additional reviews may be required. These periodic reviews are in addition to the CERCLA Five-Year Review process for sites where wastes are left on-Site. If the data available at the first such review is insufficient for a reliable trend analysis, evaluation of remedy performance will be completed in the subsequent review or at some earlier time to be established during the first review.

An evaluation of ground water information gathered for each Five-Year Review will be used to determine whether or not there is a need for additional action to reduce cleanup times. This may be a part of, or in addition to, any required Monitored Natural Attenuation studies required under Alternative 3.

The ground water cleanup goals that must be achieved within a reasonable period of time are EPA MCLs and IEPA Class I Drinking Water Standards. The determination of whether additional measures will be required for ground water will be based on compliance/projected compliance with the cleanup levels within a reasonable period of time. For this type of situation, a reasonable period of time for meeting the MCLs can be defined as less than 30 years.

At each Five-Year Review or earlier, as necessary, U.S. EPA, in consultation with Illinois EPA, will evaluate the following criteria in order to determine the need for additional remedial measures:

1. Existing contaminant levels;

2. Trends in contaminant concentrations, if any;

3. Effectiveness of the source control measures,

4. Potential reduction in restoration time frames to less than 30 years;

5. Potential for the contaminants in the ground water to reach regulatory standards and/or asymptotic levels throughout the plume; and

6. Alternative remedial measures available to meet ground water standards and the cost thereof.

Additional measures will be necessary if an evaluation of the above criteria indicates: (1) concentrations within the plume have not decreased; (2) concentrations within the plume do not show the potential to decrease below regulatory levels in less than 30 years; or (3) source control measures do not meet their remedial objectives of preventing off-Site contaminant migration.

Long term ground water monitoring would be conducted to monitor and ensure the effectiveness of Alternatives 2, 3 and 4. Ground water monitoring results will be evaluated annually to aid in predicting contaminant trends. The ground water monitoring program developed during the design phase will be used. The plan includes development of a continuous monitoring record; identification of select wells throughout the plume to monitor changes in both the horizontal and vertical extent of the plume; a specific sampling frequency; and identification and monitoring of areas containing higher contaminant concentrations, if any.

If additional measures are determined to be necessary based on Five-Year Reviews, they are likely to involve augmentation of the existing system for components other than ground water. If additional measures are required for ground water, they may include pump-and-treat design or other remedial measures, including any applicable new technology. The applicability of new technologies will be evaluated in terms of technical and economic feasibility. The design of additional measures (should they be necessary) will include: locating extraction wells (or other remedies) to maximize hydraulic capture of the plume and considering areas of greater contaminant concentrations, if any.

VIII. SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

The following nine criteria, outlined in the NCP at 40 CFR 300.430(e)(9)(iii), were used to compare the alternatives listed above and to determine the alternative for remediation of the soils, leachate, landfill gas, and ground water contamination that: (1) is protective of human health and the environment; (2) attains ARARs; (3) is cost effective; and (4) represents the best balance among the evaluating criteria. The alternative that meets the two "threshold" requirements of protectiveness and ARAR-compliance, and provides the "best balance" of trade-offs, with respect to the remaining criteria, is determined from this evaluation.

A. THRESHOLD CRITERIA

1. OVERALL PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT

Overall protection of the public health and the environment addresses whether a remedy provides adequate protection of human health and the environment and describes how risks posed by each exposure pathway are eliminated, reduced, or controlled through treatment, engineering controls, or institutional controls.

Alternative 1 does not meet this criteria because it does not take any action to protect human health and the environment. Therefore, Alternative 1 does not eliminate, reduce, or control risks.

Alternative 2 addresses the threat of leachate through long-term active collection and off-Site treatment and disposal. Leachate collection will reduce leachate migration to receptors, further reducing the potential future exposure of human health and the environment. The long-term cap inspection and repair requirements provide protection against future direct exposure to leachate, waste material and contaminated soils for current and future use. The operation and maintenance of the existing landfill gas systems provides protection against exposure to landfill gas emissions under static conditions. Alternative 2 meets the contingency requirements for augmentation of the leachate and landfill gas system. However, Alternative 2 does not have a ground water remedy component for future protection of human health and the environment. For this reason, Alternative 2 does not fully meet this criteria.

Alternative 3 contains all of the protections in Alternative 2, with the addition a Monitored Natural Attenuation remedy component for future protection of ground water. The Monitored Natural Attenuation remedy component would provide future protection of human health and the environment. Alternative 3 fully meets this criteria.

Alternative 4 includes all of the protections of Alternative 3 but replaces MNA with a ground water pump-and-treat component. The ground water pump-and-treat system would provide future protection of human health and the environment. Alternative 4 fully meets this criteria.

2. COMPLIANCE WITH APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS addresses whether a remedy will meet federal and state environmental statutes and regulations and/or provide grounds for invoking a waiver.

A. Compliance with Chemical-Specific ARARs - Table 9 is a summary of Federal and State of Illinois chemical-specific ARARS. Chemical-specific ARARs address air emission standards and ground water quality.

Ground Water Quality - Class I Potable Resource Ground Water Quality Standards listed in 35 IAC 620.410 apply to ground water. For Alternatives 3 and 4, until compliance with the standards of IAC 620.410 is achieved, ground water would be managed as a ground water management zone under IAC 620.250. U.S. EPA MCLs under 40 CFR 141 are relevant and appropriate for ground water outside the boundary of the landfill. Alternatives 3 and 4 contain a ground water component designed to meet Illinois Ground Water Quality Standards and MCLs outside the landfill boundary in a reasonable amount of time. Alternatives 1 and 2 do not contain a ground water component and would not meet either of these chemical-specific standards.

Air Emissions - Air emissions from the passive landfill venting system would be required to meet the requirements of 35 IAC 243 and the Clean Air Act 40 CFR Part 50. The IAC chemical-specific air requirements limits emissions of photochemically reactive organic material (e.g., VOCs) to less than 8 pounds per hour. The system is currently operating below that amount. Should augmentation be required in Alternatives 2, 3 and 4 that result in greater than 8 pounds per hour, controls to reduce emissions may be required.

B. Compliance with Location-Specific ARARs - Table 10 includes a list of potential Federal and State of Illinois location-specific ARARs. Potential location-specific ARARs relate to flood plains, wetlands and open waters. All alternatives meet the Federal and State of Illinois location-specific ARARs.

C. Compliance with Action-Specific ARARs - Finally, Table 11 contains a list of potential Federal and State of Illinois action-specific ARARS. Action-specific ARARs relate to construction safety standards, cap repair, Post-Closure leachate and landfill gas emissions, water quality, and discharge requirements.

Landfill Cap - Alternatives 2, 3 and 4 require long-term management of the existing landfill cap in compliance with 35 IAC Post Closure Care requirements (35 IAC 807.503-503, 523 and 524 and 811.111). Because there is no cap construction proposed in this remedy, there are no cap

Table 9: Potential Chemical-Specific ARARs
DuPage County Landfill/Blackwell Forest Preserve Superfund Site - Warenville, Illinois

MEDIA	REQUIREMENT	CITATION
Surface Water	Protect State water for aquatic life, agricultural use. primary and secondary contact use, most industrial use, and to ensure aesthetic quality of aquatic environment.	Water Quality Standards 35 IAC 302.202-302.212
	Pretreatment Standards of State and local POTW	35 IAC 310.201-220
	Effluent Guidelines and Standards	35 IAC 304.102-126
	Prohibition of discharge of oil or hazardous substances into or upon navigable waters	Federal Water Pollution Control Act Section 311(b)(3) 40 CFR 110.6, 117.21
	Comply with all applicable Federal and State water quality criteria.	CWA Section 304(a) and information published in the Federal Register pursuant to this section; 35 IAC 302.612-669
Groundwater	Meet State Groundwater Quality Standards using a Groundwater Management Zone	35 IAC 620.410 unless modified in accordance with the substantive requirements in 35 IAC 620.250 to 350
	Enforceable numeric standards for public water supplies.	Safe Drinking Water Act MCLs, 40 CFR 141.11-141.16, MCLGs - 40 CFR 141.50-141.51 and Secondary MCLs - 40 CFR 143.3

Air	Air Quality Standards.	35 IAC 243.120-126, Clean Air Act 40 CFR Part 50

Table 10: Potential Location-Specific ARARs
DuPage County Landfill/Blackwell Forest Preserve Superfund Site - Warenville, Illinois

MEDIA	REQUIREMENT	CITATION
Floodplains	Action to avoid adverse effects, minimize potential harm, and restore and preserve natural and beneficial values (in relation to implementation of the RA).	Executive Order 11988, Floodplain Management, 40 CFR 6, Appendix A, Section 6(a)(5)
	Facility shall not restrict the flow of a 100-year flood, result in washout of solid waste from a 100-year flood, or reduce the temporary water storage capacity of the 100-year floodplain	35 IAC 811.102(b)
	Facility located in a 100-year floodplain must be designed, constructed, operated, and maintained to prevent washout of any hazardous waste by a 100-year flood	35 IAC 724.118(b)
	Governs construction and filling in the regulatory floodway of rivers, lakes, and streams of Cook, DuPage, Kane, Lake, McHenry, and Will Counties, excluding the City of Chicago	92 IAC Part 708
Wetlands	Action to minimize the destruction, loss, or degradation of wetlands	Executive Order 11990, Protection of Wetlands, 40 CFR 6, Appendix A, Section 6(a)(5)
	Action to minimize adverse effects of dredged or fill materials	CWA 40 CFR 230.70-230.77

Stream	Requires Federal agencies involved in actions that will result in the control or structural modification of any stream or body of water for any purpose, to take action to protect the fish and wildlife resources which may be affected by the action	Fish and Wildlife Coordination Act, 40 CFR 6.302(g)

Table 11: Potential Action-Specific ARARs
DuPage County Landfill/Blackwell Forest Preserve Superfund Site - Warenville, Illinois

MEDIA	REQUIREMENT	CITATION
Construction	Establishes health and safety standards to be used in construction.	OSHA 29 CFR 1910
Post-Closure Care Landfill	General provisions governing post-closure requirements including the development and implementation of post-closure performance standards, inspection and repair, monitoring requirements and implementation of post-closure activities.	35 IAC 807.501, 502, 503, 523 and 524
	Specific provisions governing post-closure requirements inspections and maintenance periods. Also, specific provisions regarding cap and drainage repairs and future use considerations.	35 IAC 811.111
Post-Closure Care - Leachate	Establishes minimum requirements for leachate sampling.	35 IAC 811.206
	Establishes minimum requirements for leachate collection.	35 IAC 811.308
Leachate Treatment Storage and Disposal	Leachate Treatment and Disposal System: Establishes standards for leachate storage systems and standards for discharge to an off-site treatment works.	35 IAC 811.309(d)(e)
Post-Closure Care - Landfill Gas	Landfill Gas Monitoring Program: Establishes minimum requirements for gas collection at the site.	35 IAC 807, 811.310
	Establishes minimum requirements landfill gas sampling.	35 IAC 811.130

Landfill Gas Management	Landfill Gas Management System: Establishes minimum requirements for gas venting and collection systems	35 IAC 811.311
	Visible and particulate matter emission standards and limitations	35 IAC 212.123 (visible) and 212.321 (particulate)
	Sulfur air emissions standards and limitations	35 IAC 214.162
	Organic material emissions standards and limitations	35 IAC 215.143
	Carbon monoxide emissions standards and limitations	35 IAC 216.121, 216.141
	Nitrogen oxide emissions standards	35 IAC 217.121
	Volatile Organic Material emission standards	35 IAC 218.143
	Verify that there is no "excessive release" of hydrogen sulfide emissions during landfill gas management.	35 IAC 211.2090, 35 IAC 214.101
	Verify that emissions of hazardous pollutants do not exceed levels expected from sources in compliance with hazardous air pollution regulations.	415 ILCS 5/9.1(b), CAA Section 112, 40 CFR 61.12-14
	Estimate emission rates for each pollutant expected.	35 IAC 291.202
	Develop a modeled impact analysis of source emissions.	35 IAC 291.206
	Use Reasonably Available Control Technology (RACT).	35 IAC 211.5370, 35 IAC Part 215, Appendix E
Landfill Gas Processing and Disposal	Landfill Gas Processing and Disposal System: Establishes minimum requirements for landfill gas processing and disposal	35 IAC 811.312

Post-Closure Care - Ground Water	Groundwater Monitoring Program: Establishes minimum requirements for groundwater monitoring at the site	35 IAC 811.319(a) and Part 811.318
Discharge to POTW	Prevent introduction of pollutants into POTW which will interfere with POTW operation.	35 IAC 310.201(a)(c) and 310.202, and local POTW regulations
	Establishes standards for discharges to POTWs.	CWA 40 CFR 403, 40 CFR 122 and 125, and 40 CFR 131

construction requirements (35 IAC 811 construction requirements do not apply). Alternatives 2, 3 and 4 would all meet the ARAR requirements for the landfill cap.

Leachate - Extracted leachate associated with Alternatives 2, 3 and 4 would continue to extracted, collected and transported off-Site to a POTW and treated under an existing permit. This would be in accordance with Illinois Administrative Code 35 Post-Closure Care (35 IAC 807 and 35 IAC 811.206) and for Leachate Treatment, Storage and Disposal (35 IAC 811.309 and NPDES/CWA 40 CFR 403). If augmentation was required to the leachate system, it would be completed in compliance OSHA requirements (29 CFR 1910) and Illinois Administrative Code 35 for leachate collection (35 IAC 308) and leachate system construction and off-site discharge requirements (35 IAC 811.309). Alternatives 2, 3 and 4 would meet these requirements.

Air Emissions - Air emissions from the landfill gas system (Alternatives 2 through 4) would be subject to the relevant Post-Closure requirements of 35 Illinois Administrative Code (35 IAC 807, 811.130, 310 and monitoring under 218.143) and the Clean Air Act (CAA Section 112, 40 CFR 61.12-14). Alternatives 2, 3 and 4 would meet these requirements. If augmentation including on-Site construction of a thermal treatment devise is completed, it would be done so that it is in compliance with OSHA construction standards and Illinois Administrative Code for construction of landfill gas systems (35 IAC 811.310 and 311). The augmentation would also trigger sampling under 35 IAC 221-218 and compliance with the Clean Air Act, Section 112, 40 CFR 61.12-14. Alternatives 2, 3 and 4 would meet these requirements.

Ground Water - Alternative 4 includes ground water extraction, treatment and disposal. That disposal would be regulated by National Pollution Discharge Elimination System Permit Regulations (40 CFR 122 and 125), the Water Quality Effluent Limitations section of the Clean Water Act (40 CFR 131), and 35 IAC Parts 304 and 309. Sampling and analysis associated with discharge to a surface water body are found in 40 CFR 136.

Monitoring - All monitoring of leachate, landfill gas and ground water would be completed under Illinois Administrative Code 35 for Post-Closure Regulations (35 IAC 807 and 811). Alternatives 2, 3 and 4 would meet these ARARs.

Alternatives 3 and 4 are the only Alternatives to successfully meet all of the threshold criteria. Therefore, Alternatives 1 and 2 will not be subjected to the following primary balancing criteria.

B. PRIMARY BALANCING CRITERIA

3. LONG-TERM EFFECTIVENESS AND PERMANENCE

Long-term effectiveness and permanence refers to expected residual risk and the ability of a remedial action to maintain reliable protection of human health and the environment over time, once cleanup levels have been met. The effectiveness of the remedy would also be tracked by long-term monitoring. Pursuant to the NCP, Five-Year Reviews would be conducted to determine if the remedy is effectively reducing contaminant concentrations, if the effective limit of the remedy has been reached, or if additional actions are needed.

A. Magnitude of Residual Risk

Alternative 3

Residual risks left by Alternative 3 would be reduced lower than those calculated in the Baseline Risk Assessment and Ecological Assessment. The continued operation of the leachate extraction system would reduce the potential risks associated with high leachate volume and elevations in proportion to the resultant decrease in leachate volume, elevations and chemical concentrations. The magnitude of these reductions will be dependent on the recoverability of the leachate from the landfill interior.

The existing passive landfill gas venting system would continue to relieve buildup of gas within the landfill. The volume of gas would decrease as the refuse in the landfill stabilizes, reducing the risk associated with fracturing of the existing cap and generation of future leachate.

The entire remedy would be subject to a Five-Year Review. Additionally, a one year (or more often) critical review of the leachate extraction system would be completed. This review would consist of evaluating the effectiveness of leachate extraction to lower the leachate heads in existing leachate wells and reduce the volume of leachate contained in the landfill. Ground water monitoring data would document whether leachate extraction results in a corresponding decrease in ground water contaminant concentrations. Depending upon the results of this analysis and the number of wells that go dry, an additional 9 leachate extraction wells may be installed and operated.

Landfill gas and volume and discharge calculations will be completed to determine if the system should be upgraded from passive to active gas removal. Contaminant concentrations will also be gathered to determine whether on-Site thermal treatment is required.

A baseline Monitored Natural Attenuation Study will be completed, including projected cleanup times. Actual data would be periodically evaluated against projected data to determine if ground water will be restored to its beneficial use in a reasonable amount of time. The accumulated database from ground water monitoring would be evaluated to assess the on-going ground water quality downgradient of the landfill. The Monitored Natural Attenuation of ground water may include varying combinations of biodegradation, abiotic transformations, intrinsic bioremediation, dilution, dispersion and adsorption of ground water contaminants. Preliminary analytical data strongly support the projected success of MNA to meet cleanup goals in a reasonable amount of time. Order of magnitude decreases in ground water contaminants have been documented from 1992 sampling compared to the results of the 1997/98 data. It is reasonably expected that once the other components of the remedy have been in place for a while, significant additional improvements in ground water quality will be realized. The concentrations of contaminants in ground water concentration will continue to decrease by natural attenuation/dilution processes and also because contaminant loading will be decreased as leachate volume and pressure head are reduced by the leachate collection system. Since most of the ground water contaminants that exist at the Site are already at low concentrations, it is likely that only minimal reduction of actual contaminant mass would occur initially in ground water.

Alternative 4

Residual risks left by Alternative 4 would also be reduced lower than those calculated in the Baseline Risk Assessment and Ecological Assessment.

Alternative 4 is identical to Alternative 3 but replaces the Monitored Natural Attenuation ground water component with a ground water extraction, treatment, and discharge system. All other components are the same and result in a similar residual risk. If treated ground water is discharged to surface water or the sewer and regulatory levels would be met. Again because of the low ground water contaminant concentrations, even very large volume removals of ground water for treatment would only result in a minimal removal of the mass of contaminants.

B. Adequacy and Reliability of Controls

FPD ownership of the property is an adequate and reliable control for the Site. The landfill is maintained by FPD personnel. The possibility of residential or commercial development is eliminated by FPD ownership, since the FPD lacks the authority to sell any portion of the Forest Preserve to a private party.

Leachate extraction and treatment is a well developed remedial technology. The volume and sustainable yield of leachate at the landfill would be identified through extended pumping of the landfill extraction wells. Both Alternatives 3 and 4 include critical analyses and contingencies in the event agumentation is required. The FPD would manage the system and would utilize local contractors, suppliers, and FPD personnel for system monitoring, operation, and maintenance. The Wheaton Sanitary District POTW is currently being utilized to treat the collected leachate under an existing pretreatment permit. It is not anticipated that major elements of the system would require replacement. Submersible pumps placed in the leachate wells may require periodic maintenance to ensure adequate performance.

Passive landfill gas venting exists at the Site. Passive landfill gas venting is widely used and has proven to be an adequate and reliable means to limit landfill gas build-up and problems associated with landfill gas accumulation. The venting system is mechanically simple to operate and maintain. Both Alternatives 3 and 4 have a contingency for transition from passive to active treatment and the addition of gas vents. These are activities that have been successfully completed at numerous sites, and there are a number of proven technologies for active gas collection and on-Site treatment.

Alternative 3 includes ground water Monitored Natural Attenuation. The science behind this technology is rapidly expanding and becoming more well defined. Monitored Natural Attenuation has been successfully applied to a wide range of contaminants in a ever-expanding universe of Site-specific conditions. For Monitored Natural Attenuation, there are no specialized field engineered systems that require maintenance or operation.

Alternative 4 includes ground water extraction and treatment, which is a well developed and widely utilized remedial technology. Because of the number of wells and the high pumping rate that would be required to achieve hydraulic control in the permeable outwash deposits, long-term management and maintenance of the system would be required. However, this is a technology with proven reliability.

4. Reduction of Toxicity, Mobility, or Volume Through Treatment

This criterion considers factors such as: the treatment process used and the material treated; the amount of hazardous material destroyed or treated; the reduction in toxicity, mobility, or volume through treatment; the irreversibility of the treatment; the type and quantity of treatment residuals; and the reduction of inherent hazards. These factors are considered where appropriate.

A. Treatment Process Used and Materials Treated

Leachate - Both Alternatives 3 and 4 include extraction and collection of leachate at the landfill, followed by off-Site treatment of the extracted leachate to remove inorganics and destroy organics. Treatment of the extracted leachate would be off-Site at the Wheaton Sanitary District POTW. The metals in the leachate are treated through precipitation; semivolatiles and volatiles are biologically treated.

Landfill Gas - Both Alternatives 3 and 4 include possible augmentation from passive venting of landfill gas to active collection and on-Site treatment of landfill gas. Thermal treatment is a destructive technology that would be used on-Site. This technology uses flame to thermally treat the gases and has an efficiency of 85% or greater.

Ground Water - Alternatives 3 and 4 both provide treatment components for ground water. Alternative 3 relies on natural physical, chemical, and biological processes such as aerobic and anaerobic degradation, dilution, adsorption, and advection to remediate ground water. Alternative 4 uses engineered systems to chemically precipitate and physically strip contaminants from ground water. Both Alternatives are designed to meet regulatory standards in a reasonable amount of time.

B. Amount of Contaminated Materials Destroyed or Treated

The volume of leachate in the landfill may be as high as 50-70 million gallons, and as much as 9,500 gallons per day of leachate may be generated by infiltrating precipitation. Although there are a number of uncertainties associated with these conservative estimates, the leachate extraction program under both Alternative 3 and Alterative 4 will reduce the volume of contaminated leachate at the Site. Depending on the accuracy of the volume estimates and sustainable yield of leachate, some portion or a majority of this material may be collected at the Site and treated at the POTW.

C. Degree of Expected Reductions in Toxicity, Mobility, or Volume

Extraction, collection, and treatment of leachate from the landfill would result in reduction of leachate toxicity for both Alternatives 3 and 4. The actual effect of a leachate extraction system on the reduction of toxicity, mobility, and volume would be determined by measuring sustainable leachate yields during pumping, and monitoring leachate heads in the landfill to develop reliable estimates of leachate volume.

Removal of leachate from the landfill would decrease the mobility of the landfill leachate by reducing the hydraulic head potentially present at the landfill base. Use of submersible pumps in the leachate extraction wells would provide hydraulic control of leachate migration and mobilize leachate contaminants towards the collection wells. The volume of leachate present in the landfill would be reduced by extraction, provided the extraction system could produce an effluent flow rate greater than the rate of infiltration through the landfill cap. Both Alternatives utilize technologies that have been proven to effectively reduce contaminant toxicity, mobility and volume.

Alternatives 3 and 4 include the existing passive landfill gas venting system to continue to relieve buildup of gas within the landfill. The volume of gas within the landfill would decrease as the refuse in the landfill stabilizes, reducing the risk associated with fracturing of the existing cap and generation of future leachate. Alternatives 3 and 4 also contain contingent transition from passive to active landfill gas extraction and on-Site destructive thermal treatment. These contingencies would result in larger volumes of gas being removed and a destructive technology being applied. Both Alternatives utilize technologies that have been proven to effectively reduce contaminant toxicity, mobility and volume.

Alternatives 3 and 4 also both have a ground water component with a remedial goal of meeting regulatory standards in a reasonable amount of time. Alternative 3 relies on natural processes where Alternative 4 requires engineered systems such as on-Site pumping, active treatment and discharge. Both Alternatives are based on technologies that have been proven to effectively reduce contaminant toxicity, mobility and volume.

D. Degree to Which Treatment is Irreversible

Leachate extraction and off-Site disposal and treatment would irreversibly reduce the volume of leachate present in the landfill. The concentrations would be reduced by removal of concentrated leachate that accumulated in the landfill during construction and operation of the landfill. Leachate generated by recent infiltration of rain water could have a lower contaminant concentration, thereby reducing the overall toxicity of the leachate. Contaminants present in the extracted leachate would be irreversibly destroyed or removed from the water by off-Site treatment at the Wheaton Sanitary District POTW.

Landfill gas would be irreversibly treated under the contingencies of Alternatives 3 and 4. Thermal treatment is destructive to efficiencies greater than 85%.

The ground water components for Alternatives 3 and 4 would irreversibly reduce the volume of contaminants present in ground water at the Site. Alternative 3 utilizes natural processes while Alternative 4 relies on engineered practices. Both Alternatives provide irreversible treatment.

E. Type and Quantity of Residuals Remaining After Treatment

Any residuals associated with leachate treatment at the Wheaton Sanitary District POTW would be mixed with non-Site related residuals associated with routine operation of the treatment plant. These residuals would be disposed of according to the POTW permitting requirements.

The landfill gas thermal treatment would result in residual air emissions. The technology is largely destructive, but there would be residual gas emissions. These residual emission must be below regulatory levels.

Alternative 3 has no ground water residuals after treatment. Ground water treatment under Alternative 4 may result in off-Site disposal of metal residuals from a precipitate and discharge of treated water either to on-Site surface water or the POTW.

F. Reduction of Inherent Hazards

Alternatives 3 and 4 would equally reduce inherent hazards posed by high leachate volumes and heads in the landfill by leachate extraction and treatment. Alternatives 3 and 4 further reduce the mobility and volume of leachate and landfill gas by maintaining the integrity of the cap. A correctly functioning cap will significantly reduce the amount of infiltration that moves contaminants into leachate and ultimately migrates to ground water. A reduction in infiltration will also directly result in a reduction in the volume of leachate to be extracted and treated.

Alternatives 3 and 4 would equally reduce inherent hazards posed by landfill gas through passive gas management. Depending upon the volumes and concentrations of gas, further reductions of inherent hazards may occur through active collection and thermal treatment.

Alternatives 3 and 4 would equally reduce inherent hazards posed by ground water.

5. SHORT-TERM EFFECTIVENESS

Short-term effectiveness addresses the potential adverse effects that implementation of a remedial action may cause, considers the length of time needed to implement an alternative and the risks the alternative poses to workers, residents and the environment during implementation.

A. Risks to Community During Remedial Actions

Alternatives 3 and 4 pose only minor risks to the community from truck traffic required for transport of the leachate for treatment.

B. Risks to Workers During Remedial Actions

There is a minor risk for workers during the transfer of leachate from the containment tank to the trucks for transport to the treatment system under both Alternatives 3 and 4. These risks can be minimized by following the Site Safety Plan, using the proper safety gear, proper maintenance, and the use of standard operating procedures.

Workers performing sampling activities as part of implementing monitoring would incur potential risk through exposure to chemicals in the ground water, leachate, and landfill gas. This risk would be minimized through the use of safety procedures and personal protective equipment.

Alternative 4 may present minor risk for workers during the construction, operation and monitoring of the pump-and-treat system. This risk would be minimized through the use of safety procedures and personal protective equipment.

C. Environmental Impacts

Implementation of either Alternative 3 or 4 is not anticipated to pose additional risk to the environment.

D. Time Until Remedial Action Objectives are Achieved

The Remedial Action Objective for leachate is reducing the volume of leachate which could have the potential to release to ground water. The time needed to achieve the Remedial Action Objective to reduce leachate volume would be dependent on the actual volume present in the landfill and the sustainable yield of leachate recovery. It is anticipated that leachate will be required to be removed in the long-term (longer than 30 years).

Landfill gas management will also be required in the long-term (greater than 30 years) due to the potential for damage to the cap.

Ground water Remedial Action Objectives are currently not being met on only a relatively small portion of the Site. The exact time to meet regulatory standards would be estimated through completion of a Monitored Natural Attenuation Study (Alternative 3) or in a ground water pump-and treat system design (Alternative 4). A reasonable time frame for ground water clean up may be 30 years. Off-Site migration of ground water contaminants is not occurring at the Site.

6. IMPLEMENTABILITY

Implementability addresses the technical and administrative feasibility of a remedial action, including the availability of services and materials and services needed to implement a particular option.

All Alternatives are expected to be technically feasible and administratively implementable.

A. Technical Feasibility

Leachate extraction, transport, and off-Site disposal is the same for both Alternatives 3 and 4. Operation of the leachate extraction technology is well developed and an extraction system has been operational. The degree of success of such a recovery system varies because of the changes in the total volume of leachate and the availability of that leachate for extraction. The feasibility of recovering significant portions of leachate from this Site would be evaluated through the first critical evaluation and continued operation of the extraction system. Contingent augmentation is equivalently feasible.

The passive landfill gas venting system is in place and functioning. Implementing additional venting through new leachate extraction wells would be technically feasible. Contingent augmentation for either Alternative 3 or 4 would use standard equipment and procedures and is also technically feasible.

Procedures for conducting Monitored Natural Attenuation of Ground Water under Alternative 3 are readily implementable, well developed, and have proven reliability. Ground water extraction technologies are well developed for Alternative 4, and construction of the treatment system is technically feasible. The technologies of metal precipitation and air stripping would need to be sized accordingly, but there is standard equipment and procedures for designing systems.

B. Administrative Feasibility

The ongoing leachate extraction and disposal component of both Alternatives are administratively feasible. The existing pretreatment permit with the Wheaton Sanitary District

POTW may need to be maintained for on-going off-Site disposal of leachate for both Alternatives 3 and 4.

C. Availability of Services and Materials

The materials, services, and equipment required to implement both Alternatives 3 and 4 are readily available.

7. Cost

Cost includes estimated capital and operation and maintenance costs for a remedial action.

Alternative 1

No Cost

Alternative 2 -- *Long-Term Leachate Extraction and Off-Site Disposal; Contingent Augmentation of the Leachate and Landfill Gas Systems; Long-term O&M for all Existing Components, and Long-term Monitoring*

Estimated Costs:

Capital Costs:		
	Contingent Leachate System	$270,000
	Contingent Gas	$ 20,000
CONTINGENT CAPITAL COSTS		**$290,000**
Operation and Maintenance Costs:		
	Leachate O&M	$ 94,000
	Cap O&M	$ 2,400
	Landfill Gas O&M	$ 3,600
	Monitoring	$299,000
ANNUAL O&M		**$399,000**

NET PRESENT WORTH	**(29 years at 7%)**	**$5,739,000**
	(29 years at 3%)	**$8,497,000**

Capital Costs The capital costs for the contingencies are estimated to be $290,000. This includes $270,000 for additional leachate and $20,000 for contingent gas collection and treatment.

Operation and Maintenance - Operation and maintenance costs would be those incurred from operating the leachate recovery system, including power, mechanical systems upkeep, and periodic replacement (e.g., lubrication, repair, etc.), heating, and preheating (if appropriate). Operation and maintenance costs would also be incurred for ground water quality monitoring, leachate head monitoring and characterization. The annual O&M cost for Alternative 2 is estimated to be $399,000, with the largest cost going to monitoring. It is assumed that the leachate extraction system would be operated for greater than 30 years.

Alternative 3 - *Long-term Leachate Extraction and Off-Site Disposal; Contingent Augmentation of the Leachate System and Landfill Gas Systems, Long-term O&M for all Existing Components; Long-term Monitoring, and Monitored Natural Attenuation for Ground Water*

Estimated Costs:

Capital Costs:		
	Contingent Leachate System	$270,000
	Contingent Gas	$ 20,000
CONTINGENT CAPITAL COSTS		**$290,000**
Operation and Maintenance Costs:		
	Leachate O&M	$ 94,000
	Cap O&M	$ 2,400
	Landfill Gas O&M	$ 3,600
	Monitoring	$ 299,000
ANNUAL O&M		**$399,000**
Monitored Natural Attenuation Costs:		
	Baseline Study	$ 55,000
	Additional Monitoring	$ 25,000
TOTAL MNA COST		**$ 80,000**

NET PRESENT WORTH	**(29 years at 7%)**	**$5,819,000**
	(29 years at 3%)	**$8,577,000**

Capital Costs The capital costs for the contingencies are estimated to be $290,000. This includes $270,000 for additional the leachate system and $20,000 for contingent gas collection and treatment.

Operation and Maintenance - Operation and maintenance costs would be the same as Alternative 2 and include costs incurred from operating the leachate recovery system, including power, mechanical systems upkeep, and periodic replacement (e.g., lubrication, repair etc.), heating, and preheating (if appropriate). Operation and maintenance costs would also be incurred for ground water quality monitoring, leachate head monitoring and characterization. The annual O&M cost for Alternative 3 is the same as Alternative 2 and is estimated to be $399,000, with the largest cost going to monitoring. It is assumed that the leachate extraction system would be operated for greater than 30 years.

Ground Water - The ground water component in Alternative 3 includes Monitored Natural Attenuation. The baseline study includes sampling for multiple parameters that are not included in routine monitoring and complex fate and transport modeling. The baseline study is estimated to cost $55,000. Monitored Natural Attenuation also may include additional rounds of sampling to illustrate progress toward restoring ground water to its beneficial use in a reasonable amount of time. These additional sample requirements are estimated to cost $25,000.

Alternative 4 - *Long-term Leachate Extraction and Off-Site Disposal; Contingent Augmentation of the Leachate System and Landfill Gas Systems; Long-term O&M for all Existing Components; Long-term Monitoring, and Ground Water Extraction and Treatment Construction/Operation.*

Estimated Costs:

Capital Costs:	
Contingent Leachate System	$270,000
Contingent Gas	$ 20,000
CONTINGENT CAPITAL COSTS	**$290,000**
Ground Water Pump and Treat Construction Cost	**$726,000**
TOTAL CAPITAL COST	**$1,016,000**
Operation and Maintenance Costs:	
Leachate O&M	$ 94,000
Cap O&M	$ 2,400
Landfill Gas O&M	$ 3,600
Monitoring	$299,000
Ground Water	$ 83,000
ANNUAL O&M	**$482,000**

NET PRESENT WORTH	**(29 years at 7%)**	**$7,553,813**
	(29 years at 3%)	**$10,923,813**

Capital Costs The capital costs for the contingencies are estimated to be $290,000. This includes $270,000 for additional leachate and $20,000 for contingent gas collection and treatment, similar to Alternatives 2 and 3.

Ground Water - The ground water component in Alternative 4 includes installation of ground water pump-and-treat system. The capital costs for this system are estimated at $726,000.

Operation and Maintenance - O&M costs would be similar to Alternatives 2 and 3. However, there would be additional costs for O&M of the ground water system. The additional annual O&M for ground water treatment is $83,000.

C. MODIFYING CRITERIA

8. STATE ACCEPTANCE

State acceptance indicates whether, based on its review of the RI/FS and Proposed Plan, the State of Illinois concurs, opposes, or has no comment on the selected remedial action.

The State of Illinois has expressed a willingness to concur with the selected remedy. The letter of concurrence will be added to the Administrative Record for this Site.

9. COMMUNITY ACCEPTANCE

Community acceptance addresses the community's acceptance of the preferred Alternative presented in the Proposed Plan based on comments received during the public comment period. The Responsiveness Summary, attached to this ROD, contains the significant comments received during the public comment period and the U.S. EPA's responses to those comments.

IX. THE SELECTED REMEDY

The U.S. EPA has selected Alternative 3 for the final remediation of the DuPage County Landfill Superfund Site.

Alternative 3 includes:

- long-term institutional controls;
- long-term operation and maintenance of the improved landfill cap;
- long-term leachate extraction with possible augmentation of 9 additional wells;
- long-term off-Site leachate treatment and disposal;
- long-term passive landfill gas collection with possible augmentation to active with a flare;
- Monitored Natural Attenuation for ground water ; and
- long-term ground water, leachate, landfill gas monitoring.

Estimated Costs:

Capital Costs:

Contingent Leachate System	$270,000
Contingent Gas	$ 20,000
CONTINGENT CAPITAL COSTS	**$290,000**
Operation and Maintenance Costs:	
Leachate O&M	$ 94,000
Cap O&M	$ 2,400
Landfill Gas O&M	$ 3,600
Monitoring	$ 299,000
ANNUAL O&M	**$399,000**
Monitored Natural Attenuation Costs:	
Baseline Study	$ 55,000
Additional Monitoring	$ 25,000
TOTAL MNA COST	**$ 80,000**

NET PRESENT WORTH	**(29 years at 7%)**	**$5,819,000**
	(29 years at 3%)	**$8,577,000**

The long-term institutional controls (deed restrictions, erosion/flood control) and operation and maintenance of the cap (inspections, improvements, etc.) will begin immediately and extend for the long-term (greater than 30 years). These components of the remedy will ensure that land use changes or on-site construction is not completed in a way that may present an exposure risk or would negatively impact the remedy. Specifically, the deed restrictions bars future development of the Site and bars ground water use. The cap will eliminate possible direct exposure to leachate, landfill gas, or other waste material. Also, the cap will result in a significant reduction in the long-term generation of leachate.

The selected remedy will address the main source of mobile contamination by the extraction and off-Site treatment of leachate from the landfill for the long-term (greater than 30 years). Extraction of leachate and maintenance of the cap will be ongoing responsibilities. Treatment and disposal of the leachate will be conducted off-Site in the long-term.

Landfill gas will also be addressed in the long-term (greater than 30 years) due to the ongoing threat of gas build-up damaging the cap. Landfill gas will be addressed to minimize exposure and the threat of migration to ground water. Landfill gases will be managed to allow future recreational use of Mt. Hoy for the long-term.

The recommended Alternative may or may not require additional design and construction of the contingent components. The first critical evaluation will be completed after one year of operation. If augmentation is required, it would be completed in about 3.5 years.

Ground water contamination should continue to decrease dramatically and result in achieving cleanup levels in less than the estimated 30 years. A detailed analysis of the ground water projections will be completed during the first phase of the Monitored Natural Attenuation Remedy Study. The Monitored Natural Attenuation of ground water may include varying combinations of biodegradation, abiotic transformations, intrinsic bioremediation, dilution, dispersion and adsorption of ground water contaminants. Preliminary analytical data strongly support the projected success of MNA to meet cleanup goals in a reasonable amount of time. Order of magnitude decreases in ground water contaminants have been documented from 1992 sampling compared to the results of the 1997/98 data. It is reasonably expected that once the other components of the remedy have been in place for a while, significant additional improvements in ground water quality will be realized. Based on existing data, it appears that ground water quality has made significant improvement, such that regulatory standards may be met well in advance of 30 years. Additionally, contamination significantly above background levels is not migrating off-Site.

Monitoring is an essential part of this remedy. A monitoring network will be established on the Site that includes leachate, landfill gas, and ground water. Monitoring will serve two purposes: 1) evaluate the effectiveness of the treatment/containment components of the remedy to reduce risks, and 2) monitor for changes in potential migration of contaminated media from the Site. If monitoring identifies that contamination is not decreasing or being managed appropriately and/or cleanup levels are not being achieved, the remedy will be re-evaluated.

Cleanup levels to be achieved by the selected remedial action will be chemical-specific ARARs. If multiple contaminants are present in the media (i.e. ground water), and cleanup of individual contaminants to ARARs result in a cumulative risk in excess of 10^{-6} across a media, cleanup levels of contaminants will be risk-based and cumulative across a media to 10^{-6} or less. If chemical-specific ARARs do not exist for contaminants, cleanup levels of contaminants will be risk-based and cumulative across a media to 10^{-6} or less.

The point of compliance for ground water cleanup levels will be the landfill boundary. Ground water will meet the U.S. EPA primary MCLs and IEPA 620 Standards outside of the landfill footprint. All on-Site ground water that does not currently meet these standards will be placed in a ground water management zone and remediated using Monitored Natural Attenuation. On-Site ground water will be managed as a IAC 620 Groundwater Management Zone until the standards or background concentrations are met.

The point of compliance for cleanup levels of landfill gas emissions shall be sampling at the top of the Mt. Hoy and the landfill boundary. These are areas of potential landfill gas emissions and areas of recreational use. The air standards for recreational users is 10^{-6} and a hazard index less than 1.

The selected remedial action is expected to be the final response for the Site. Because this remedial action will result in hazardous substances remaining on-Site, a review will be conducted within five years after commencement of remedial action to ensure that the remedial action continues to provide adequate protection of human health and the environment.

X. STATUTORY DETERMINATIONS

U.S. EPA's primary responsibility at Superfund sites is to select and implement remedial actions that achieve adequate protection of human health and the environment. Section 121 of CERCLA establishes several statutory requirements and preferences. When complete, a remedy selected by U.S. EPA must comply with ARARs under federal and state environmental laws (unless a statutory waiver is justified). The selected remedy must also be cost effective and utilize permanent solutions and alternative treatment or resource recovery to the maximum extent practicable. Finally, the statute includes a preference for remedies that employ treatment processes that permanently and significantly reduce the toxicity, mobility, or volume of hazardous substances, pollutants, and contaminants. The U.S. EPA believes that Alternative 3 meets the threshold criteria and provides the best protection with respect to the criteria used to evaluate the alternatives (National Contingency Plan 40 CFR Part 300.430(f)(5)(ii)(A-F). The implementation of the selected remedy at the Site satisfies these requirements and preferences as follows:

A. Protection of Human Health and the Environment

The selected remedy will protect human health and the environment by utilizing institutional controls to reduce risks. Specific actions include fencing portions of the Site and posting warning signs and imposing deed restrictions on the landfill property. The risks posed by inhalation of landfill gases are reduced by collecting and treating landfill gases, if necessary. The potential for direct exposure to leachate will be addressed through the cap and leachate extraction and off-Site treatment.

The ground water will be actively addressed through Monitored Natural Attenuation. In addition to Monitored Natural Attenuation, the interaction of several components of Alternative 3 will assist in decreasing ground water contamination and achieve cleanup levels. The repaired landfill cap will reduce infiltration of precipitation into the landfill, thereby reducing generation of leachate, and will also reduce the percolation of leachate from the landfill into ground water. Extraction and treatment of leachate from the landfill will address the primary source of ground water contamination. Management of landfill gas will also minimize the threat of gas migrating to ground water.

Cleanup levels to be achieved by the selected remedial action will be chemical-specific ARARs. If multiple contaminants are present in the media (i.e. ground water), and cleanup of individual contaminants to ARARs result in a cumulative risk in excess of 10^{-6} across a media, cleanup levels of contaminants will be risk-based and cumulative across a media to 10^{-6} or less. If chemical-specific ARARs do not exist for contaminants, cleanup levels of contaminants will be risk-based and cumulative across a media to 10^{-6} or less.

Long-term monitoring will be conducted to ensure the effectiveness of the remedy.

B. Attainment of ARARs

Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)

Applicable requirements are those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under Federal or State environmental or facility siting law that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site. Relevant and Appropriate requirements are those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under Federal or State environmental or facility citing law that, while not "applicable" to a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site, address problems or situations sufficiently similar to those encountered at the CERCLA site that their use is well suited to this particular Site.

Compliance with ARARs addresses whether a remedial action will meet all requirements of federal and state environmental laws and regulations and/or provide a basis for a waiver from any of these laws. Federal and State ARARs are divided into three categories: chemical-specific, action-specific, and location-specific. Alternative 3 will meet or attain all Federal or State ARARs and will be implemented in a manner consistent with those laws. It is important to note that on-Site actions are required to comply with ARARs, but must comply only with the substantive parts of the ARAR. Off-Site actions must comply only with applicable requirements, but must comply fully with both substantive and administrative requirements. The selected remedy will meet all ARARs under federal and more stringent state environmental laws. A list of ARARs for the Site is contained in Tables 9, 10 and 11. The primary ARARs that will be achieved by the selected remedy are:

1. Chemical-Specific ARARs

Chemical specific ARARs regulate the release to the environment of specific substances having certain chemical characteristics. Chemical-specific ARARs typically determine the extent of clean-up at a Site. For this Site, these are:

a. Federal Chemical-Specific ARARs

Chemical-specific ARARs include those laws and requirements that regulate the release of contaminants to the environment. These include:

Safe Drinking Water Act, 40 CFR 141.61 (organic) and 141.62 (inorganic) Maximum Contaminant Levels (MCLs) and, to a certain extent, 40 CFR 141.50 (organic) and 141.51 (inorganic) non-zero Maximum Contaminant Level Goals (MCLGs). The Federal Drinking

Water Standards promulgated under the Safe Drinking Water Act (SDWA) are applicable to municipal drinking water supplies servicing 25 or more people. MCLGs are relevant and appropriate when the standard is set at a level greater than zero (for non-carcinogens); otherwise, MCLs are relevant and appropriate. At the Site, MCLs and MCLGs are relevant and appropriate. The point of compliance for the Federal drinking water standards is at the boundary of the landfill.

Clean Air Act (40 CFR Part 50) - The Clean Air Act requirements include the TSP standard for air discharges. This requirement is applicable to the Site because the gas extraction and treatment, leachate treatment, and various other treatment methods which are part of this remedy are potential sources of fugitive dust, particulates, and/or VOCs.

b. State Chemical-Specific ARARs

Illinois Administrative Code Class I Potable Resource Ground Water Quality Standards listed in 35 IAC 620.410 apply to ground water. For Alternative 3, until compliance with the standards of IAC 620.410 are achieved, ground water would be managed as a Groundwater Management Zone under IAC 620.450.

Illinois Administrative Code for landfills. The chemical-specific air requirements are contained in 35 IAC Section 243 limits emissions of photochemically reactive organic material (e.g., VOCs) to less than 8 pounds per hour. The system is currently operating below that amount. Should augmentation be required in Alternative 3 that result in greater than 8 pounds per hour, controls to reduce emissions may be required.

2. Location -Specific ARARs

Location-specific ARARs are those requirements that relate to the geographic position of the Site. For the Site, these are:

a. Federal Location-Specific ARARs

Floodplain Management Executive Order 11988, 40 CFR 6, Appendix A, Section 6(a)(5) - This order requires minimization of potential harm to or within flood plains and the avoidance of long- and short-term adverse impacts associated with the occupancy and modification of flood plains. This order is applicable to the Site since it is located within a flood plain and additional work may be required. Alternative 3 would meet this ARAR.

Wetland Management Executive Order 11990 - This order requires federal agencies to avoid, to the extent possible, the long- and short-term adverse impacts associated with the destruction or modification of wetlands. This requirement is applicable to the Site since there are wetlands located on the Site and additional contingent work may be required. Alternative 3 would meet this ARAR.

Clean Water Act 40 CFR 230.70-230.77 - Requires actions to minimize adverse effects of dredged or fill materials. Alternative 3 would meet this ARAR.

Fish and Wildlife Coordination Act - Requires Federal agencies to take action to protect fish and wildlife resources that may be affected by stream or body of water modifications. Alternative 3 would meet this ARAR.

b. State Location-Specific ARARs

Location-specific ARARs are those requirements that relate to the geographical location of a Site. State location-specific ARARs identified for this action are:

35 IAC 811 and 35 IAC 724 100-Year Floodplain requirements - A facility shall not restrict the flow of a 100-year flood, result in washout of solid waste from a 100-year flood, or reduce the temporary water storage capacity of the 100-year floodplain. A facility located in a 100-year floodplain must be designed, constructed, operated, and maintained to prevent washout of any hazardous waste by a 100-year flood. Alternative 3 meets this ARAR.

92 IAC Part 708 Construction and Filling Requirements - Governs construction and filling in the regulatory floodway of rivers, lakes, and streams of Cook, DuPage, Kane, Lake, McHenry, and Will Counties, excluding the City of Chicago. Alternative 3 meets this ARAR.

3. Action-Specific ARARs

a. Federal Action-Specific ARARS

OSHA 29 CFR Safety Standards - Construction activities included in Alternative 3 would be subject to standards found in 29 CFR 1910 and 29 CFR 1926. Threshold limit values would be monitored in the breathing zone during construction activities. Alternative 3 would meet this ARAR.

Clean Air Act and Emission Limitations, CAA Section 112, 40 CFR 61.12-14. Requires that emissions of hazardous pollutants do not exceed levels expected from sources in compliance with hazardous air pollution regulations These requirements relate to air quality and emission limitations for landfill gas. Alternative 3 would meet this ARAR.

40 CFR 122 and 125, the National Pollution Discharge Elimination System Permit Regulations and 40 CFR 131 the Water Quality Effluent Limitations sections applies to the off-Site treatment and disposal of leachate. Alternative 3 would meet these ARARs.

b. State Action-Specific ARARs

35 IAC 807 and 811 Post-Closure Care - Establishes minimum requirements for maintenance and inspection of final cover and vegetation and establishes minimum requirements for ground water and landfill gas monitoring. Alternative 3 would meet these ARARs.

35 IAC 811 206, 308 and 309 Post-Closure Care for Leachate Treatment, Storage and Disposal - These regulations deal with the leachate sampling, leachate collection, leachate storage and the extracted leachate that would be treated off-Site by a POTW under an existing permit. Alternative 3 would meet these ARARs. Augmentation of the leachate system would also meet 35 IAC 811.309 system design requirements.

35 IAC 807 and 811 Post-Closure Care for Landfill Gas - These regulations deal with monitoring landfill gas. 35 IAC 218 deals with ongoing landfill gas emissions. Alternative 3 would meet these ARARs. If augmentation including on-Site construction of a thermal treatment device is completed, it would be done so that it is in compliance with Illinois Administrative Code for construction of Landfill Gas Systems (35 IAC 811.310 and 311). The augmentation would also trigger sampling under 35 IAC 221-218 and compliance with the Clean Air Act, Section 112, 40 CFR 61.12-14. If augmentation is required, the system would be designed to meet these requirements.

4. To Be Considered

No To Be Considered criteria were found.

C. Cost Effectiveness

The U.S. EPA believes that the selected remedial action is cost-effective in mitigating the risks posed by the Site contaminants within a reasonable period of time. Section 300.430(f)(ii)(D) of the NCP requires that EPA evaluate cost-effectiveness by comparing all the alternatives which meet the threshold criteria of protection of human health and the environment against three additional balancing criteria: long-term effectiveness and permanence; reduction of toxicity, mobility, or volume through treatment; and short-term effectiveness. The selected remedial action meets these three criteria and provides overall effectiveness in proportion to its cost. The estimated cost for the selected remedial action is $290,000 in contingent capital cost, $399,000 in annual O&M and $80,000 in ground water Monitored Natural Attenuation cost, which is a reasonable value for the results expected to be achieved by the selected remedial action. The Net Present Value for Alternative 3 for 29 years at the 7% discount rate is $5,819,000. The U.S. EPA believes the selected remedy is the most cost-effective remedy that also achieves ARARs and satisfies the other criteria of the NCP and Section 121 of CERCLA.

D. Utilization of Permanent Solutions and Alternative Treatment Technologies to the Maximum Extent Practicable

U.S. EPA has determined that the selected remedy represents the maximum extent to which permanent solutions can be utilized in the most cost-effective manner to eliminate exposure to contaminated soil at the Site and prevent the continued migration of contaminants into the ground water. Of the alternatives that are protective of human health and the environment and comply with ARARs, U.S. EPA has determined that the selected Alternative provides the best balance in terms of long-term effectiveness and permanence, reduction in toxicity, mobility or volume through treatment, short-term effectiveness, implementability, cost and consideration of state and community acceptance.

The criterion of overall protection of human health and the environment and long-term effectiveness and permanence were crucial in the decision to select Alternative 3. Overall protection of human health and the environment was best achieved by the selected remedial action because it provides protection of human health from risks through institutional controls and cap maintenance to eliminate the direct exposure pathway, collection and off-Site treatment and disposal of leachate. The threat of exposure to landfill gas and damage to the cap is managed by the landfill gas system, and ground water is addressed through Monitored Natural Attenuation. By treating leachate, collecting landfill gas, and minimizing infiltration, ground water contamination will decrease, cleanup levels will be achieved, and the continued migration of leachate and contaminated ground water is reduced.

Long-term effectiveness and permanence was best achieved by the selected remedial action due to leachate and ground water treatment components. Leachate in the landfill will be extracted and treated to reduce residual risks in ground water. The ground water in the shallow aquifer beneath and adjacent to the landfill will be cleaned up through Monitored Natural Attenuation. U.S. EPA believes that Monitored Natural Attenuation can achieve cleanup standards in a time that is comparable to pump-and-treat, is equally as protective as pump-and-treat, is far less costly ($5,819,000 Net Present Worth for Alternative 3 versus $7,553,813 for Alternative 4), and is more easily implemented.

The State of Illinois has expressed a willingness to concur with the selected remedy. The letter of concurrence will be added to the Administrative Record for this Site. The community's comments received during the public comment period are summarized in the Responsiveness Summary, attached to this ROD, along with the U.S. EPA's response to comments.

The selected remedial action meets the statutory requirement to utilize permanent solutions and treatment technologies, to the maximum extent practicable.

E. Preference for Treatment

The selected remedial action satisfies the statutory preference for treatment as a principal element. Landfill leachate will be collected/extracted and treated off-Site. Depending upon landfill gas concentrations, landfill gas may also be thermally treated on-Site. Ground water will be treated on-Site using natural attenuation processes. The DuPage County Landfill, the low level waste source of contamination, will not be treated, but will be contained by a landfill cap.

XI. RESPONSIVENESS SUMMARY

This Responsiveness Summary has been prepared to meet the requirements of Sections 113(k)(2)(B)(iv) and 117(b) of CERCLA, as amended by SARA, which requires U.S. EPA to respond "to each of the written or oral presentations" on a Proposed Plan for remedial action. On July 8, 1998, U.S. EPA made available to the public for review and comment the FS and Proposed Plan for the final remedy at the Site. U.S. EPA received comments at the public meeting on July 22, 1998. Additional written comments were also submitted to U.S. EPA during the comment period. This Responsiveness Summary summarizes those comments and concerns expressed by the public and other interested parties in written and oral form on the recommended remedy.

Summary of Comments Received During the Public Comment Period

Comments received during the public comment period are summarized in this section. Some of the comments have been paraphrased in order to effectively summarize them in this document. For the sake of consistency and privacy, U.S. EPA has referred to all individual commenters as "he." The reader is referred to the public meeting transcript and copies of written comments submitted, all of which are contained in the Administrative Record for the Site. The Administrative Record is available for review at the information repositories.

Comment

I would want to ensure that monitoring extend beyond the limits of the current plume as long as possible, that it not be restricted just to the areas that are currently seen as troublesome but that it look at the broader picture, particularly in that southeast quadrant where the drainage down towards Spring Brook and river occurs.

Response

The U.S. EPA concurs with the comment on the necessity to sample not only in the area of known contamination but downgradient from that area. For this reason the FPD is required to submit a long-term plan to sample wells within the plume (called detection wells) and downgradient of the plume (called compliance wells). The approved monitoring plan calls for sampling thirteen (13) wells within the area of contamination (detection wells) and ten (10) wells downgradient *(compliance wells) of the contamination. Four (4) of the ten (10) compliance wells were recently installed to be used in combination with the previously installed wells. These wells are placed in the very quadrant between the landfill and Spring Brook and the river identified in this comment. These wells will be sampled for the long-term.*

Comment

Are there any plans to retest the wells in the vicinity when you think you have got the problem solved?

Response

There are several areas and wells to which this comment could apply, so the following will respond to each. The first area of note is the detection wells located within the plume (the area where there is currently contamination). Sampling in this area will continue in the long-term, well past the time when contamination is no longer present. The FPD will be required to initially demonstrate through sampling that the contamination is being reduced within the plum. In the longer-term the FPD will be required to demonstrate through sampling that the other remedy components are working (cap, landfill gas, leachate removal). For this reason, the detection wells will be sampled, most likely, in perpetuity. The second area is the compliance wells located downgradient of the detection wells. These compliance wells will be sampled as long as contamination is detected in the detection wells, and for some period after contamination is no longer present. So for these areas, the wells will also be retested. There are also a number of additional wells on-Site that are not designated as compliance or detection wells and there are private wells on the other side of Spring Brook. It is anticipated that none of these wells will be retested unless specific information identified at a later time indicates this need. Sampling of these wells is currently considered either unnecessary to monitor the extent of contamination and/or unnecessary to demonstrate the remedy's effectiveness.

XII. ADMINISTRATIVE RECORD

The Superfund Administrative Record Index for this Site is attached.

ADMINISTRATIVE RECORD INDEX

FOR

DUPAGE COUNTY LANDFILL

04/28/92

DOC#	DATE	AUTHOR	RECIPIENT	TITLE/DESCRIPTION	PAGES
1	[illegible]	U.S. Geological Survey	U.S. EPA	7.5 Min. Quadrangle Map	1
2	[illegible]	Testing Service Corp.	U.S. EPA	Blackwell Recreational Preserve Map	1
3	01/19/84	[illegible]	Poyner, B., Testing Service Corp.	Analytical results of water samples.	50
4	[illegible]/84	Testing Service Corp.	Gerrick, S., Forest Preserve Dist. of Dupage County	Sampling	8
5	06/15/84	Gerrick, S., Forest Preserve Dist. of DuPage County	[illegible], Craig, Illinois EPA	Sampling analysis reports for monitoring wells	[illegible]
6	[illegible] 84	Utt, R., Forest Preserve Dist. of DuPage County	[illegible], E & E, Inc.	July, 1984 water quality analysis from new monitoring wells and perimeter wells.	47
7	[illegible]/91	Warzyn, Inc.	Lance, R., U.S. EPA	Planning Document Project [illegible], 5 Vols.	[illegible]
8	[illegible]/91	Warzyn, Inc.	Lance, R., U.S. EPA	Addendum Work Plan, Field Sampling Plan, & Quality Assurance Project Plan	234

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U.S. EPA ADMINISTRATIVE RECORD
REMEDIAL ACTION
DUPAGE COUNTY LANDFILL/BLACKWELL FOREST PRESERVE
DUPAGE COUNTY, ILLINOIS
UPDATE #1
05/24/95

DOC#	DATE	AUTHOR	RECIPIENT	TITLE/DESCRIPTION	PAGES
1	12/00/94	Warzyn Inc.	U.S. EPA	Final Remedial Investigation Report: Volume 1 of 3 (Text, Tables, and Figures)	424
2	12/00/94	Warzyn Inc.	U.S. EPA	Final Remedial Investigation Report: Volume 2 of 3 (Appendices A-F)	628
3	12/00/94	Warzyn Inc.	U.S. EPA	Final Remedial Investigation Report: Volume 3 of 3 (Appendices G-Y)	469
4	12/00/94	Warzyn Inc.	U.S. EPA	Final Remedial Investigation Report: Volume 3 of 3 (Addendum 1 of 3: Attachments A-E)	766
5	12/00/94	Warzyn Inc.	U.S. EPA	Final Remedial Investigation Report: Volume 3 of 3 (Addendum 2 of 3: Attachment E)	734
6	12/00/94	Warzyn Inc.	U.S. EPA	Final Remedial Investigation Report: Volume 3 of 3 (Addendum 3 of 3: Attachments F-O)	744

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U.S. EPA ADMINISTRATIVE RECORD
REMEDIAL ACTION
DUPAGE COUNTY LANDFILL/BLACKWELL FOREST PRESERVE
DUPAGE COUNTY, ILLINOIS
UPDATE #2
10/01/96

DOC#	DATE	AUTHOR	RECIPIENT	TITLE/DESCRIPTION	PAGES
1	03/01/96	U.S. EPA	Forest Preserve District of DuPage County	Administrative Order by Consent w/Attached Cover Letter	62

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U.S. ENVIRONMENTAL PROTECTION AGENCY
REMEDIAL ACTION

ADMINISTRATIVE RECORD
FOR
DUPAGE COUNTY LANDFILL/BLACKWELL FOREST PRESERVE LANDFILL SITE
DUPAGE COUNTY, ILLINOIS

UPDATE #3
JULY 9, 1998

NO.	DATE	AUTHOR	RECIPIENT	TITLE/DESCRIPTION	PAGES
1	12/28/92	Hoffman, D., Warzyn, Inc.	Lance, R., U.S. EPA	Cover Letter Forwarding the *Draft Feasibility Study* for the Blackwell Forest Preserve Landfill Site	1
2	01/22/93	McLane, G., PRC Environmental Management, Inc.	Lance, R., U.S. EPA	Letter re: PRC's Comments on the December 1992 *Draft Feasibility Study* for the Blackwell Forest Preserve Landfill Site	13
3	01/25/93	Tuggle, B., U.S. DOI/ Fish & Wildlife Service	Lance, R., U.S. EPA	Letter re: FWS's Comments on the *Draft Feasibility Study* for the Blackwell Forest Preserve Landfill Site	2
4	01/28/93	Marrero, J., U.S. EPA/ Air Toxics & Radiation Branch	Lance, R., U.S. EPA	Memorandum re: ATRB's Review of the *Draft Feasibility Study Report* for the Blackwell Forest Preserve Site	1
5	01/29/93	Kleiman, J., U.S. EPA	Lance, R., U.S. EPA	Memorandum re: RCRA's Review of the *Draft Feasibility Study* for ARARs for the Blackwell Forest Preserve Site	1
6	07/28/94	Warzyn Engineering	U.S. EPA	Drawing: Water Table Map for Upper Aquifer at the Backwell Forest Preserve Landfill Site	1
7	02/21/95	Kleiman, J., U.S. EPA	Heaton, D., U.S. EPA	Memorandum re: RCRA's Review of the *Alternative Array Document* for the Blackwell Forest Preserve Landfill Site for ARARs	9
8	04/04/95	Marrero, J., U.S. EPA/ Air Toxics & Radiation Branch	Heaton, D., U.S. EPA	Memorandum re: ARARs for the Blackwell Forest Preserve Landfill Site	2
9	04/07/95	Lanham, R., IEPA	Heaton, D., U.S. EPA	Letter re: IEPA's Response to U.S. EPA's Request for Additional ARARs Information for the Blackwell Forest Preserve Landfill Site	6

NO.	DATE	AUTHOR	RECIPIENT	TITLE/DESCRIPTION	PAGES
10	07/24/95	Marrero, J., U.S. EPA/ Air Toxics & Radiation Branch	Heaton, D., U.S. EPA	Memorandum re: ATRB's Review of the *Draft Feasibility Study* for the Blackwell Forest Preserve Landfill Site	1
11	08/08/95	Kleiman, J., U.S. EPA	Heaton, D., U.S. EPA	Memorandum re: RCRA's Review of the *Feasibility Study* for the Blackwell Forest Preserve Landfill Site for ARARs	1
12	03/01/96	Muno, W., U.S. EPA	Utt, R., Forest Preserve District of DuPage County	Letter Forwarding Attached Administrative *Order by Consent* for the DuPage County Land-fill/Blackwell Forest Preserve Site	60
13	1997	Montgomery Watson	Addressees	Construction Progress Meeting Notes for the Period August 26 - December 3, 1997 for the Blackwell Forest Preserve Landfill Site	29
14	1997-1998	Montgomery Watson	U.S. EPA	*Monthly Progress Reports* for the Period October 1997 - May 1998 for the Blackwell Forest Preserve Landfill Site	53
15	01/00/97	Montgomery Watson	U.S. EPA	*Technical Memorandum: Predesign Investigation* for the Blackwell Forest Preserve Landfill Site	299
16	02/00/97	Montgomery Watson	U.S. EPA	*Leachate Collection System Expedited Final Design: Volume 1 of 2 (Text, Tables, Figures and Appendices A-D) [Final]* for the Blackwell Forest Preserve Landfill Site	201
17	02/00/97	Montgomery Watson	U.S. EPA	*Leachate Collection System Expedited Final Design: Volume 2 of 2 (Appendices E-G) [Final]* for the Blackwell Forest Preserve Landfill Site	188
18	03/04/97	Bellot, M., U.S. EPA	Benedict, J., Forest Preserve District of DuPage County	Letter re: U.S. EPA's Comments on the Predesign *Investigation Technical Memorandum* for the Black-well Forest Preserve Landfill Site	3

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19	04/10/97	Montgomery Watson	U.S. EPA	*Predesign Report* for the Blackwell Forest Preserve Landfill Site w/ Cover Letter	335
20	04/04/97	Bellot, M., U.S. EPA	Benedict, J., Forest Preserve District of DuPage County	Letter re: U.S. EPA/ IEPA's Comments on the February 1997 *Leachate Collection System Expedited Final Design Report* for the Blackwell Forest Preserve Landfill Site	7
21	04/10/97	Montgomery Watson	U.S. EPA	MW's Responses to U.S. EPA's March 4, 1997 Comments on the January 1997 *Predesign Investigation Technical Memorandum* for the Blackwell Forest Preserve Landfill Site	5
22	04/21/97	Buettner, W. & P. Vagt; Montgomery Watson	Bellot, M., U.S. EPA; et al.	FAX Transmission re: Preliminary Agenda for the April 23, 1997 Meeting Concerning the Blackwell Forest Preserve Landfill Site	2
23	04/23/97	Montgomery Watson	U.S. EPA	Tables: (1) SOW Compliance Project Schedule, (2) Expedited Project Schedule and Drawings: (3) Preliminary Grading Plan and (4) Typical Cover Details for the Blackwell Forest Preserve Landfill Site	4
24	05/00/97	Montgomery Watson	U.S. EPA	*Revised Leachate Collection System Expedited Final Design: Volume 1 of 2 (Text, Tables, Figures and Appendices A-D) [Final]* for the Blackwell Forest Preserve Landfill Site	217
25	05/00/97	Montgomery Watson	U.S. EPA	*Revised Leachate Collection System Expedited Final Design: Volume 2 of 2 (Appendices E-G) [Final]* for the Blackwell Forest Preserve Landfill Site	184

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26	05/02/97	Vagt, P. & W. Buettner; Montgomery Watson	Bellot, M., U.S. EPA	Letter re: MW's Response to U.S. EPA/IEPA's Comments on the February 1997 *Leachate Collection System Expedited Design Report* for the Blackwell Forest Preserve Landfill Site	13
27	05/13/97	Bellot, M., U.S. EPA	Benedict, J., Forest Preserve District of DuPage County	Letter re: U.S. EPA's Partial Approval of the *Leachate Collection Systems Expedited Final Design Report* for the Blackwell Forest Preserve Landfill Site	1
28	05/15/97	Buettner, W., Montgomery Watson	Bellot, M., U.S. EPA	Letter Forwarding Attached Photographs of the North and West Stormwater Collection Systems at the Blackwell Forest Preserve Landfill Site	8
29	05/20/97	Dovantzis, K., PRC Environmental Management, Inc.	Bellot, M., U.S. EPA	Letter re: PRC's Tech-Review of the May 1997 *Leachate Collection System Expedited Final Design Report* for the	2
30	06/02/97	Montgomery Watson	U.S. EPA	*Cap Repair 100% Design Report* for the Blackwell Forest Preserve Landfill Site w/ Cover Letter	156
31	06/09/97	Buettner, W., Montgomery Watson	Bellot, M., U.S. EPA	Letter re: Boring Logs Omitted from the April 1997 *Predesign Report* for the Blackwell Forest Preserve Landfill Site	2
32	06/09/97	Buettner, W., Montgomery Watson	Bellot, M., U.S. EPA	Letter re: Manhole MH-3 Groundwater Sample Results at the Blackwell Forest Preserve Landfill Site	76
33	06/16/97	Bellot, M., U.S. EPA	Benedict, J., Forest Preserve District of DuPage County	Letter re: U.S. EPA/IEPA's Comments on the May 1997 *Final Leachate Collection System Expedited Final Design Report* for the Blackwell Forest Preserve Landfill Site	2

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34	06/17/97	Bellot, M., U.S. EPA	Benedict, J., Forest Preserve District	Letter re: U.S. EPA's Conditional Approval of the June 1997 *Cap Repair 100% Design Report* for the Blackwell Forest Preserve Landfill Site	2
35	06/23/97	Dovantzis, K., PRC Environmental Management, Inc.	Bellot, M., U.S. EPA	Letter re: PRC's Technical Review of the June 1997 *Cap Repair 100 Percent Design Report* for the Blackwell Forest Preserve Landfill Site	1
36	07/00/97	Montgomery Watson	U.S. EPA	*Revised Predesign Report* for the Blackwell Forest Preserve Landfill Site	43
37	07/03/97	Vagt, P., Montgomery Watson	Addressees	Memorandum re: the July 15, 1997 Pre-Construction Meeting for the Blackwell Forest Preserve Landfill Site	1
38	07/10/97	Buettner, W., Montgomery Watson	Bellot, M., U.S. EPA	Letter re: MW's Response to U.S. EPA/IEPA's June 16, 1997 Comments on the *Final Leachate Collection System Expedited Final Design Report* for the Blackwell Forest Preserve Landfill Site	20
39	07/14/97	Van Matre, L., *Chicago Tribune*	Public	Newspaper Article: *Waste Cleanup to be Done at Blackwell*	1
40	07/25/97	Dovantzis, K., PRC Environmental Management, Inc.	Bellot, M., U.S. EPA	Letter re: PRC's Technical Review of MW's July 10, 1997 Response to U.S. EPA's Comments on the *Leachate Collection System Expedited Final* Design Report for the Blackwell Forest Preserve Landfill Site	2
41	07/28/97	Buettner, W., Montgomery Watson	Bellot, M., U.S. EPA	Letter Forwarding Attached *Draft Deed Restriction* for the DuPage County Landfill/Blackwell Forest Preserve Site	5

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42	08/07/97	McDonough, J. & W. Buettner; Montgomery Watson	Maki, B., DuPage County	Letter Forwarding Attached July 28, 1997 *Stormwater Runoff/Erosion Control Plan for Leachate Collection System and Landfill Cap Repair* for the Blackwell Forest Preserve Landfill Site	7
43	08/12/97	Buettner, W., Montgomery Watson	Bellot, M., U.S. EPA;	FAX Transmission re: Cancellation of August 13, 1997 Construction Progress Meeting for the Blackwell Forest Preserve Landfill Site	1
44	08/14/97	Blair, T. & W. Buettner; Montgomery Watson	Bellot, M., U.S. EPA	Letter: Pre-Construction Investigation Addendum for the Blackwell Forest Preserve Landfill Site	10
45	08/19/97	Lindland, K., U.S. EPA	Mack, K., Office of Dupage County State's Attorney	Letter re: U.S. EPA's Request for Confirmation that Permits will not be Required for Work Performed at the Blackwell Forest Preserve Site	2
46	08/21/97	Bellot, M., U.S. EPA	Benedict, J., Forest Preserve District of DuPage County	Letter re: U.S. EPA/ IEPA's Review of the July 10, 1997 Response to Comments for the *Final Leachate Collection System Expedited Final Design* for the Blackwell Forest Preserve Landfill Site	1
47	08/21/97	Bellot, M., U.S. EPA	Benedict, J., Forest Preserve District of DuPage County	Letter re: U.S. EPA/ IEPA's Comments on the the July 25, 1997 *Revised Predesign Report* for the Blackwell Forest Preserve Landfill Site	2
48	08/28/97	Buettner, W., Montgomery Watson	Bellot, M., U.S. EPA	Letter Forwarding Attached *Addendum No. 4: Field Sampling Plan for the North Stormwater Pipe Subsurface Soil Investigation and Surface Water Sampling of Sand Pond* for the Blackwell Forest Preserve Landfill Site	90
49	09/09/97	Buettner, W., Montgomery Watson	Bellot, M., U.S. EPA	Letter re: Backfill of Leachate Collection System Trenches at the Blackwell Forest Preserve Landfill Site	2

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50	09/15/97	Labunski, S., Tetra Tech EM, Inc.	Bellot, M., U.S. EPA	Letter re: Tetra Tech's Technical Review of the August 28, 1997 *Field Sampling Plan and Quality Assurance Project Plan for the Predesign Activities* at the Blackwell Forest Preserve Landfill Site	3
51	09/19/97	Dovantzis, K., Tetra Tech EM, Inc.	Bellot, M., U.S. EPA	Letter re: *Field Oversight Summary No. 1 for Final Remedial Design Activities* at the Blackwell Forest Preserve Landfill Site	25
52	09/22/97	Buettner, W., Montgomery Watson	Bellot, M., U.S. EPA	Letter re: Use of the Low Flow Sampling Method for Quarterly Groundwater Monitoring Activities at the Blackwell Forest Preserve Landfill Site w/ Attached April 1996 U.S. EPA Publication *Ground Water Issue: Low Flow (Minimal Drawdown) Groundwater Sampling Procedures* (EPA/540/ S-95/504)	14
53	09/24/97	Buettner, W., Montgomery Watson	Bellot, M., U.S. EPA	*Addendum No. 3 to the Final Leachate Collection System Expedited Design Report* for the Blackwell Forest Preserve Landfill Site	24
54	10/08/97	Bellot, M., U.S. EPA	Benedict, J., Forest Preserve District of DuPage County	Letter re: U.S. EPA/ IEPA's Comments on the August 28, 1997 *Addenda to Sampling Plans for the Proposed Investigation of the North Stormwater Pipe and Surface Water Sampling of Sand Pond* for the Blackwell Forest Preserve Landfill Site	3
55	11/20/97	Dovantzis, K., Tetra Tech EM, Inc.	Bellot, M., U.S. EPA	*Field Oversight Summary No. 2 for Final Remedial Design Activities* at the Blackwell Forest Preserve Landfill Site	87

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56	12/04/97	Buettner, W., Montgomery Watson	Bellot, M., U.S. EPA	*Revised Addenda to Sampling Plans for the Proposed Investigation of North Stormwater Pipe and Surface Water Sampling* of Sand Pond at the Blackwell Forest Preserve Landfill Site	96
57	12/05/97	Buettner, W., Montgomery Watson	Bellot, M., U.S. EPA	Letter re: Water Sample Results from Manhole MH-20 for the Installation of the Leachate Control System at the Blackwell Forest Preserve Landfill Site	59
58	12/22/97	Dovantzis, K., Tetra Tech EM, Inc.	Bellot, M., U.S. EPA	Letter re: Tetra Tech's Technical Review of the Revised Addendum to the Sampling Plan for the North Stormwater Pipe at the Blackwell Forest Preserve Landfill Site	5
59	12/24/97	Bellot, M., U.S. EPA	Benedict, J., Forest Preserve of Dupage County	Letter re: Revised Addenda to Sampling Plans for the Proposed Investigation of the North Discharge Pipe at the Blackwell Forest Preserve Landfill Site	2
60	12/31/97	Dovantzis, K., Tetra Tech EM, Inc.	Bellot, M., U.S. EPA	Letter re: Field Over-sight Summary No.3 for Final Remedial Design Activities at the Black-well Forest Preserve Landfill Site	19
61	01/07/98	Buettner, W., Montgomery Watson	Bellot, M., U.S. EPA	Letter re: Outstanding Construction Items Identified During the Pre-Final Inspection for the Blackwell Forest Preserve Landfill Site	2
62	01/22/98	Tetra Tech EM, Inc.	U.S. EPA	*Draft Site-Specific Plans* for the Blackwell Forest Preserve Landfill Site	522
63	02/00/98	Montgomery Watson	U.S. EPA	*Monitoring Well Assess-ment Report* for the Blackwell Forest Preserve Landfill Site	123
64	02/18/98	Vagt, P., Montgomery Watson	Bellot, M., U.S. EPA	Letter re: *Natural Attenuation Study* at the Blackwell Forest Preserve Landfill Site	7

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65	02/26/98	Finkelberg, L., U.S. EPA/ Field Services Section	Bellot, M., U.S. EPA	Memorandum re: FSS' Review of the *Draft Quality Assurance Project Plan* for Natural Attenuation Evaluation and Split Sample Collection at the Blackwell Forest Preserve Landfill Site (Incorrectly Dated February 26, 1997)	4
66	03/11/98	Finkelberg, L., U.S. EPA/ Field Services Section	Bellot, M., U.S. EPA	Memorandum re: FSS' Review of *Addendum #5* to the *Quality Assurance Project Plan* for the Blackwell Forest Preserve Landfill Site	5
67	03/23/98	Bellot, M., U.S. EPA	Benedict, J., Forest Preserve District of DuPage County	Letter re: U.S. EPA/ IEPA's Approval, with Modification, of the February 18, 1998 *Proposed Natural Attenuation Study* for the Blackwell Forest Preserve Landfill Site	2
68	04/00/98	Montgomery Watson	U.S. EPA	*Quality Assurance Project Plan: Addendum #5 (Quarterly Groundwater Monitoring)* for the Blackwell Forest Preserve Landfill Site	19
69	04/00/98	Montgomery Watson	U.S. EPA	*Quality Assurance Project Plan: Addendum #6 (Selected Revisions)* for the Blackwell Forest Preserve Landfill Site	55
70	04/13/98	Montgomery Watson	U.S. EPA	Review and Planning Meeting Notes for 1998 Activities at the Blackwell Forest Preserve Landfill Site	16
71	04/21/98	Buettner, W., Montgomery Watson	Bellot, M., U.S. EPA	*Quarterly Groundwater Report: First Round (November 1997)* for the Blackwell Forest Preserve Landfill Site	44
72	04/21/98	Buettner, W. & P. Vagt; Montgomery Watson	Bellot, M., U.S. EPA	Letter re: Anomalous Phenol and Phthalate Concentrations in the First Round of Quarterly Groundwater Sampling at the Blackwell Forest Preserve Landfill Site w/ Attachments	362

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U.S. ENVIRONMENTAL PROTECTION AGENCY
REMEDIAL ACTION

ADMINISTRATIVE RECORD
FOR
DUPAGE COUNTY LANDFILL/BLACKWELL FOREST PRESERVE LANDFILL SITE
DUPAGE COUNTY, ILLINOIS

UPDATE #4
SEPTEMBER 24, 1998

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